March 1985

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# sinclair user

Issue No 36

Only 95p

BRITAIN'S BEST SELLING SINCLAIR MAGAZINE



## MONTY IS INNOCENT

50 games up for grabs

## SKOOL DAZE

The Beak speaks out

Sinclair buggy — who needs it?

## ENTRY POINT

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# Contents

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## FEATURES

**58** **STATE OF THE ART** Psion graphics ace Ann Hughes.

**61** **ENTRY POINT** The basics of computing. New series.

**110** **SINCLAIR C5** Is Sir Clive taking us all for a ride? We pedal his wares.

**116** **COMPETITION** Spring Monty Mole from his cell.

**122** **ADVENTURE PROGRAMMING** John Gilbert creates some AI characters.



*Street credibility? page 110*

## REGULARS

**5** **SINCLAIRVOYANCE** Old wounds are re-opened in the Sinclair/Acorn battle.

**7** **NEWS** The C5 hits the streets, Spectrum hits the deck, Clive hits Chris Curry.

**10** **SINCLAIR SIMON** A quiet evening down at the local.

**11** **QL NEWS** New packages from Sinclair, QL disc interface.

**17** **GREMLIN** Sir Clive proves he has punch and Chris Curry of Acorn gets it.

**25** **HARDWARE WORLD** A new range from DK'tronics and the Touchmaster graphics pad.

**34** **SPECTRUM SOFTWARE SCENE** Ghostbusters, Airwolf, Match Day and Danger Mouse.

**47** **SINCLAIR SURGERY** The good doctor is in.

**50** **HIT SQUAD** David Reidy master programer, reminicses abuot his skool daze, hem-hem.

**53** **BOOKS** Seymour Papert has mind storms and we try some software projects.

**68** **ADVENTURE** Graphics games explored. Gordo Greatbelly ventures forth.

**101** **SINCLAIR BUSINESS USER** Mike Wright takes a look at the electric office and QL Quilmerge.

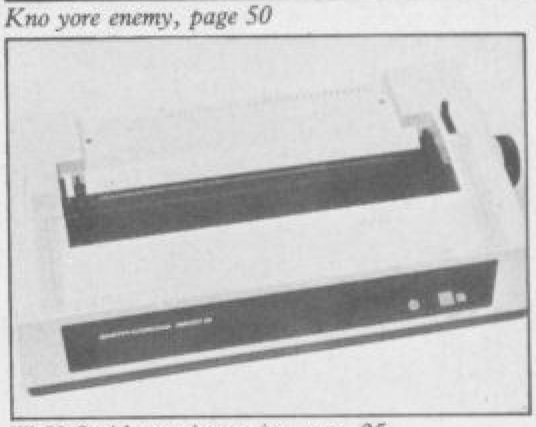
**128** **HELPLINE** Andrew Hewson delves into the Spectrum memory and builds a digital clock.



*Spectrum price war, page 7*



*Kno yore enemy, page 50*



*W H Smith gets into print, page 25*

## PLUS

**19** **LETTERS** More gas and gripes from our mail-bag.

**30** **TOP 30** The most popular software of 1984.

**45** **CROSSWORD** Cryptic clues from Henry Howarth.

**45** **SUBSCRIPTIONS** The best way to avoid disappointment.

**77** **PROGRAM PRINTOUT** QL user-defined graphics package.

**131** **CLUB CORNER** Enthusiasts from all over the globe.

**137** **SOFTWARE DIRECTORY** Our guide for buyers.

**143** **HARDWARE DIRECTORY** DIY Sinclair Repairs.

# The best deal for SPECTRUM owners?

# Prove it

We wanted to tell you about the Logic 3 Spectrum Club.

We wanted to show you how our independent reviewers praise products that are good and slate those that are bad (even if a product has been hyped into the charts). We absolutely had to explain how we pick software from some of the biggest (and some of the smallest!) publishers in the business, and how our range of games, educational software, books and programming utilities is second to none.

Of course, we were going to tell you about the top discounts for club members, our New Member's bonus scheme, the "Win a Microdrive Competition", and how the club had grown to 8,000 members in just six months . . .

But then we figured out that you would want to check all this out for yourself. So this month we are making a special offer—send in the coupon—and we will send you, absolutely FREE, the latest 20-page edition of the club catalogue—packed with 150 reviews!

LOGIC 3

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# CLASH OF THE TITANS

HITTING someone over the head with a rolled-up newspaper may not be featured in the latest guides to modern business practice but it is a certain way of making sure you hit the headlines.

It is definitely a more entertaining way of settling your differences than bringing in the lawyers. Cheaper and more effective as well, if the festive season disagreement between Sir Cive and his arch-rival, Chris Curry of Acorn Computers, is anything to go by.

Following the tortuous road of legal processes to obtain redress can always ensure that the original course of the dispute will be remembered far better than the outcome. The Rule of Rolled Newspaper, on the other hand, ensures headlines and the immediate opportunity to put the record straight. It is more satisfying too.

It does help if you are the media's favourite new technologist and if the object of your spontaneous irritation is a former colleague and most serious competitor, but it opens up many new possibilities which could hit the pockets of the legal profession and provide the need for a new correspondent in the newspapers.

Perhaps the battle for circulation in the popular tabloids could be settled with rolled-up copies of the *Mirror* and the *Sun* held by Robert Maxwell and Rupert Murdoch instead of Bingo; elections could be decided by Margaret Thatcher and Neil Kinnock with copies of the *Daily Telegraph* and the *Guardian*.



Readers will have realised by now that the basis for all this speculation is the incident which occured just before Christmas at a public house in Cambridge and which is related in more detail on the news pages.

The fact that it took place between two grown, apparently intelligent, men says a great deal about the competitive nature of the home computer market and the rivalry between the two industry chiefs.

When Sir Clive set up his first company, Sinclair Radionics, one of his employees was Chris Curry. He worked as a technician during the period when the calculators, black watch and small television were being developed, produced and sold.

Their association continued as Sir Clive reduced his interests in Radionics and was involved in a company called Science of Cambridge – the forerunner of Sinclair Research.

Then towards the end of 1979, as Sir Clive was doing the preparatory work on the revolutionary ZX-80, Chris left. He set up Acorn Computers with Hermann Hauser, launched the Atom in the same year as the ZX-80 and the two have been in keen competition ever since.

While being serious business rivals they have remained friends, apart from the odd incident. But Sir Clive has never been able to hide his disappointment at not getting the BBC contract which went to Acorn. That meant he suffered in the education market, and while he succeeded in the selling stakes he came second in product image: the BBC micro has always been the serious machine while the Spectrum was relegated to games playing.

That says much for the character of Sir Clive. It is not sufficient for him to be a commercial success – he has to be a success on his own terms. Despite the fact that the Spectrum is by far the most popular micro in Britain, and is a serious contender for the number one position in the world, Sir Clive gives the impression he would have preferred to have sold fewer machines and have them taken as seriously as the BBC machines.

He is an innovative thinker who sees himself as changing the world for the better. He does not like to think of himself as the mastermind behind the best value games machine on the market.

All that would appear to make little difference to the consumer. There are however two problems which could arise.

Competition is good for the consumer providing that it is fair competition. Advertising which makes outrageous claims about one machine's reliability and another's lack of it does nothing to help anyone. It does not enable customers to take better informed decisions but instead only confuses. That means that more people will make bad decisions about which computer to buy and find they have a machine which does not suit their needs.

Secondly, the industry is reaching a turning point. The tremendous growth of the past few years, for which Sir Clive is responsible, is over. If the market is to see further growth a manufacturer has to take the quantum leap of producing a machine that will appeal to the majority of the population which has shown no inclination to join the computer-owning classes.

What is needed is a person with the vision to see what those people will find attractive and then provide it. On past experience there is only one person who has demonstrated that necessary imagination – Sir Clive Sinclair.

Games-playing is not to be sneered at. It has already made the Spectrum the most popular computer in the UK, and surveys indicate that most alien-zappers sooner or later progress to exploring the full potential of their machines.

*Nigel Clarke*

# Sinclair declares Spectrum price war

THE SPECTRUM is to be discontinued and the Spectrum Plus to be priced at £129.95 in a series of massive price cutting moves by Sinclair Research.

The shock moves come only weeks after the announcement of an upgrade kit which turns the Spectrum into a Spectrum Plus for £50. Kits will now cost £30.00 if installed by Sinclair Research and £20.00 in do-it-yourself form.

Reasons for the cuts, which could lead to a new price war, were given by Sir Clive Sinclair. "The home computer market is currently entering a very vigorous phase and we anicipate strong competition from US manufacturers in particular".

As a result, Acorn Computers has brought the price of the Electron in line with that of the Plus, to £129.95.

All is not well, however, in the add-on business. Companies such as DK'tronics and Saga Systems could lose business in the keyboard market. David White of Saga says: "We have brought down the price of our Emperor keyboard from £55.95 to £49.95. We think that people will still want to put a good keyboard onto their machines."

The one piece of bad news in the package concerns the Six-Pack sold with the Spectrum Plus. Customers will now have to pay a promotional price of £14.95 to obtain the six titles, worth £67.00.

Celebrations of Sinclair's success in the computer market continued at the *Which Computer?* Show in Birmingham. A competition was held in which the five millionth computer was up for grabs. In typical Sinclair style it was a gold coloured QL.

## Radioactive micro fashion

WHAT, you might wonder, is the well-dressed computer user going to wear this Spring? What better than the Microshield VDU Smock?

Surprisingly, that is not as funny as it may seem at first. There is great controversy as to whether or not radiation from VDU screens is harmful. Your 14in portable TV gives off far more radiation than a commerical VDU so if your bits start slipping you will know why.

As yet, the question of TV radiation affecting home computer users has not been raised, possibly because it appears mainly to affect pregnant women and there are few female users.

Details from Rolenworth International Ltd, 8 North Street, Chichester, West Sussex PD19 1LB. Tel 0243-774271.



## Reports of death greatly exaggerated

THE HOME computer boom is over, according to recent reports in the national press.

Except for the Sinclair Spectrum and Commodore 64, computer sales last Christmas did not live up to expectations and it is doubtful whether the predicted one million units were sold.

Of all the hardware manufacturers, Sir Clive Sinclair is the happiest, describing the Christmas season as "extremely good and way up on last year".

Gary Lockwood, PR agent for Commodore, comments, "the Commodore 64 has exceeded our expectations", and on the subject of Commodore's sales over the Christmas period, says, "we have not got our exact sales figures at present and I am not going to pick a number out of the air — which is what Sir Clive has done".

Acorn suffered its worst Christmas ever. The *Sunday Times* reported that despite a £4.5m pre-Christmas advertising campaign, Acorn's sales fell far short of its target of 30,000 machines.

Dealers overstocked and, when the Christmas rush didn't happen, were lopping as much as £40.00 off the BBC price.

Perhaps the biggest surprise was the lack of MSX hardware. Although the Japanese are eager to corner a large section of the UK market, there were only a few thousand MSXs for sale, mostly from Toshiba, Sanyo and Sony.

There have been predictions of doom ever since the computer industry evolved. 1985 will be the turning point for many but competition is still fierce.

## Micronet matters

ONE OF four young hackers involved in the recent spectacular breach of **Prestel** security — during which the Duke of Edinburgh's private electronic mail was examined — has been recruited by **Clive Sinclair** for a job at his Cambridge Metalab.

The hacker, who remains anonymous, was given this remarkable reward for ingenuity after explaining to Sir Clive how he and his friends managed to obtain the highest possible security clearance on the Prestel system and thereby gain complete power over the 350,000 page database.

The 19-year old Micronet member explained his new job as "investigating opportunities for Sinclair Research in the field of telecommunications"; he refused to say if this might be connected with the rumoured portable Spectrum with integral modem.

Micronet's **Chatline** is the most popular area on Prestel — and that's official.

Chatline is Micronet's 'Citizen's Band' emulator, allowing subscribers to send electronic messages, uncensored by the editorial staff, for immediate display to the thousands of other users.

Only two months after Chatline's opening, over 15,000 messages were posted on the system during December 1984.

"It's just gossip," says Micronet Technical Manager, **Mike Brown.** "Nobody talks about technical stuff — it's just people chatting and talking about the things which friends discuss.

"The nicest thing is that people can feel they're being left alone to partake in their own event. Micronet just set up the facility and then walked away."

*Sid Smith, Micronet news editor*

*more news on page 8*

# Clivemobile cruises in

SIR CLIVE'S electric buggy — the Sinclair C5 — was unveiled at Alexandra Palace on January 10, almost a year after the launch of the controversial QL.

Before the assembled and sceptical press Sir Clive announced his latest revolutionary product — a battery-powered tricycle, the result of 10 year's research and development, and over £7m of investment.

With a top speed of 15mph and a range of only 20 miles, the vehicle is termed a 'pedal-assisted cycle' and can be driven by anyone aged over 14, without needing a driving licence, road tax, insurance or helmet.

The open top, single-seater is steered by handlebars placed, surprisingly, underneath the driver's thighs. It is nevertheless easy and comfortable to drive. The battery is recharged by connecting it to a domestic power socket for eight hours; its range might be considerably less than the 20 miles stated, depending on road conditions and manoeuvres.

The basic machine costs £399. It is available through mail order only at first, with an additional £29 for delivery, though retail outlets are planned by the summer. Optional extras, considered by many to be essential, include wing mirrors, indicators, horn, seat cushions and weather-proof clothing. Those push up the price to more than £600.

The C5 has met with widespread criticism in the press and on TV: the British Safety Council, the Royal Society for the Prevention of Accidents and the Automobile Association have also expressed reservations about its safety on the roads. The AA says, "It could, due to its size and inconspicuousness, present a hazard to its occupant and other road users."



Sir Clive is dismissive of critics, claiming that the trike is safer than any conventional two-wheeled transport, but admitted at the launch that it had not yet been test-driven in daytime traffic on public roads.

Sinclair Vehicles is hoping for sales in excess of 100,000 in 1985. Orders were taken at Alexandra Palace, and sales approached 1,000 in the first week.

# Currah vow of silence

CURRAH will never speak again. The company which made the speech synthesis products for the Spectrum and Commodore 64 has been bought recently by DK'tronics for a substantial but undisclosed sum. Says David Heelas, head of DK, "The purchase of Currah is a natural complement to our existing range."

DK'tronics has bought the sole rights to manufacture and sell Microspeech, Speech 64, Microslot and Microsource and will be manufacturing those products at their factory.

However, John Herrin, chairman of Welwyn Electronics — which manufactured the Currah products before the takeover — stated in the *Standard*, "Welwyn will be taking over sales as well as manufacture . . . we expect to treble production to some 250,000 units this year." Apparently, Welwyn are looking for a turnover of some £7,500,000 from sales in the first year and have formed a sales and marketing team to sell the products direct to retail outlets and distributors as agreed under the original contract.

David Heelas was not pleased with the news. "Welwyn has no right to sell anything after it has disposed of its stocks." He added, "we have all the tools for the injection-moulded cases". Those will be supplied to Welwyn under the terms of the contract and in that way, Heelas reckons he will be able to monitor the number of units Welwyn will be producing.

Under the terms of Welwyn's contract with Currah was a clause stating that if Currah went into liquidation, Welwyn would have the rights to sell the products remaining in stock and to manufacture a stated number of units.

Richard Philbrick from Welwyn says "Our output is limited to the terms of our contract, we will be selling and manufacturing around 120,000 units". That differs considerably from the 250,000 units stated by Welwyn's chairman in the *Standard*.

Welwyn's future in the home computer market seems to be limited unless it produces a product under its own name. Philbrick thinks that is a possibility and adds, "120,000 units is a lot of units in the speech market". DK'tronics will also be producing speech synthesisers but Philbrick is not worried, "DK'tronics hasn't many units and will have to start production from scratch."

# Modem price slashed 30%

THE PRICE of the Prism VTX-5000 communications modem for the Spectrum has been cut from £99.95 to £69.95.

Paul Streeter, the sales director of Prism, is confident that the move will create more interest in computer networks such as Micronet 800. He says of the VTX: "The drop in price will clearly help it to appeal to a broader range of Spectrum owners who are keen to get into communications as long as the price is right."

The modem has been available for two years and was designed to work only with the Spectrum. It gives access to computer networks which provide users with telesoftware, viewdata services such as Prestel and electronic mailbox facilities on which messages can be left and answered.

The modem may undergo design changes in the future as a result of the discontinuation of the Spectrum. Such a move is being considered, claims Prism, but is unlikely in the near future.

# Sir Clive hits out in pub punch-up

THE RIVALRY between Sir Clive Sinclair and former employee Chris Curry, now head of Acorn Computers, developed into open warfare over the Christmas period.

Having commissioned a survey on the reliability of micros which appeared to demonstrate the superiority of the BBC over the Spectrum, advertisements were placed in two national newspapers on behalf of Acorn, implying that Spectrums bought as Christmas presents would soon be taken back to the shops, and their owners would do better to buy BBC computers instead.

The advertisement so angered Sir Clive that he attacked Curry in the *Baron of Beef*, a Cambridge pub where both are regular customers. Sir Clive walked up to Curry and slapped him about the head, then argued with him about the advertisement. There was some shoving and jostling, and the two men later began fighting again in *Shades*, an upmarket Cambridge wine bar.

Such strong passions amazed the national press, which appear to have believed that the world of technology is populated by cold fish with few emotions. Sir Clive even fell victim to the notorious columnist Jean Rook, who said in the *Daily Express* that she thought the fight gave him sex appeal.

The two leaders of British home computing are now said to have made up their differences, and Chris Curry was a welcome guest at Sir Clive's New Year's Eve party.

Sir Clive's brother Iain Sinclair comments, "It's nice to know our captains of industry are just as capable of letting their hair down and making complete idiots of themselves as the rest of us."

## Bugs attempt to sabotage free booklet

DUE to some unfortunate type-setting errors in last month's free booklet four of the programs contained errors in syntax.

*Tip 18*. Line 9915 contained an extra opening bracket at the beginning of the line. It should start IF (PEEK( . . .

*Tip 31*. Line 100 should read: IF A(K)< B THEN LET B=A(K): LET D=K. Line 135 should be inserted: NEXT M

*Tip 36*. At lines 30 and 40 LENS should read LEN.

*Tip 47*. The two extra opening brackets at the start of line 270 should be deleted.

We apologise to readers for these errors and hope that they are finding the booklet useful.

## Spectrum + upgrade

SINCLAIR has just launched the official Spectrum Plus upgrade kit — so if you are feeling hard done by, having just bought a Spectrum 48K, cheer up because you can upgrade it for a mere £20.00.

The kit provides you with the new keyboard — complete with 58 hard, moulded keys including a space bar — an 80-page user guide and companion cassette which provides you with three arcade games and an 'interactive tour of the new keyboard'. You will, however, lose out on the free pack of software which comes with a new Spectrum Plus.

According to Sinclair, you need no knowledge of electronics to tackle the upgrade, only a soldering iron and a steady hand.

If you do not feel up to the job, Sinclair will do it for you for £30.00 and return your computer within a record-breaking 10 days.

The Spectrum Plus upgrade will accept all peripherals in your Sinclair system. All future Spectrum peripherals are being designed with the Plus in mind.

## The force is going soft

RETURN of the Jedi and **Deathstar Battle** form two major software releases from Sinclair Research.

The games, both for the Spectrum Plus, follow the adventures of Luke Skywalker and bear more than a slight resemblance to the events portrayed in the George Lucas **Star Wars** film trilogy.

The two packages will be part of the Spectrum Plus six pack, available free with the machine, replacing two other titles.

## The fate of a stuntman

ELITE has suffered a small setback with its latest game — **Fall Guy.** A few days after its launch **Fall Guy** stumbled, damaging the game's turbo load facility in the process.

Five thousand copies of the game were initially released with the turbo load facility which refused to load the game at all. **Fall Guy** has since been recalled.

Steve Wilcox from Elite comments, "We immediately remastered the tape to produce the game without the turbo load. Anyone experiencing loading problems should return them to us for a replacement."

The fault can be rectified by adjusting the alignment of the cassette heads.

## Runner drops out of the race

FRONT RUNNER, the K-Tel software subsidiary, appears to be tightening its belt in 1985.

K-Tel entered the software market in 1983 and its first batch of releases included **It's Only Rock 'n' Roll,** which proved a minor success. The company name, Front Runner, was launched less than a year ago and its recent releases include **Boulder Dash** and **Space Professor.**

However, the recession seems to be hitting even major record companies like K-Tel and a decision was taken recently to withdraw Front Runner from the LET show — a trade show at which almost every software house will be present.

According to a company spokesman, Front Runner is, at present, taking a close look at the market. Asked if that meant that Front Runner would be pulling out of the market altogether, the spokesman replied, "Not necessarily so", but did not specifically deny the suggestion.

*more news on page 10*

# Expert ghostbusters

THERE was an outstanding response to the **Ghostbusters** competition published in the December issue of *Sinclair User*. The 100 winners are listed below:

Craig Dudley, Beeston, Leeds; T E Cheese, Lordshill, Southampton; Jon White, Banbury, Oxfordshire; P Edmonds, Hyde, Cheshire; Dean Guilder, London, E7; David Matson, Stockport, Greater Manchester; Clive Marner, Halstead, Essex; Michael Guest, Cramlington, Northumberland; J Molony, Denmead, Hampshire; John Bishop, West Bridgford, Nottingham; Jonathan Hart, Alton, Hampshire; Mark Edwards, Ledbury, Herefordshire; J Gordon, Bridgwater, Somerset; Jonathan Ruddock, South Shields, Tyne and Wear; Paul Mallon, Carnmoney, County Antrim, Northern Ireland; S Beesley, Erdington, Birmingham; Simon Groves, Park Avenue, Wolverhampton; P W E Camp, Cowley, Oxford; Scott Lewis, Tonbridge, Kent; Jason Kilner, Ardsley, Barnsley; J Catton, Pinner, Middlesex; S G Mitchell, Basingstoke, Hampshire; J M Carr, Darlington, County Durham; M Stevens, Fairford, Gloucester; Stephen Rees, Winstanley, Wigan; Tumai Gmver, Scunthorpe, South Humberside; Stephen Grover, Banstead, Surrey; Neil Smith, Cronton, Cheshire; Paul McNeil, Penicuik Midlothian, Scotland; P Sellick, Abingdon, Oxfordshire; M McMahon, Lanarkshire, Scotland; M Jenkins, Hollywood, Birmingham; Ron Canham, Epsom, Surrey; Adam Coxall, East Molesey, Surrey; Barry Gill, St Helens, Merseyside; B J Griffin, Grappenhall, Warrington; Andrew Collins, Dronfield, Sheffield; H Wallis, Greenford, Middlesex; G Kerr, Prescot, Merseyside; Andrew Brown, Dulverton, Somerset; Stephen Watson, By Cupar, Fife; C Crane, Stoke-on-Trent, Staffordshire; J Castle, London E6; John Mee, Grimsby, South Humberside; S Tett, Bridgwater, Somerset; R Walsh, Birkenhead, Merseyside; Jason Brown, Camberley, Surrey; Gavin Marshall, Kingston-upon-Thames, Surrey; Andrew Biggs, Horley, Surrey; Lee Hughes, Coventry; Chris Fletcher, St Bees, Cumbria; Keith Stewart, Eastleigh, Hampshire; Michael Polak, Dundee; Richard Johnson, Bolton-Le-Sands, Lancashire; Hilda Gibson, Chorlton, Manchester; Matthew Plumbtree, Colchester, Essex; J Redpath, Herne Bay, Kent; Barbara Bamfield, Scarborough, Yorkshire; James Millington, Dronfield, near Sheffield; Ben Taylor, Stroud, Gloucestershire; Rich Porter, Wirral, Merseyside; Mrs Littlewood, Hull, North Humberside; Clive Wood, Nantwich, Cheshire; A G Sleeman, Lincoln; Simon Carn, Bristol, Avon; Owen Whitehead, Barnsley; E Fairless, Killingsworth, Newcastle on Tyne; Andrew Hogg, Barking, Essex; D Williams, Stockport, Cheshire; John Myatt, Upton-on-Severn, Worcester; Serena Gabrielsen, Huyton, Liverpool; Bill Walsh, Bangor, County Down, Northern Ireland; Peter Johnston, Ballymeana, County Antrim, Northern Ireland; George Rivers, Basingstoke, Hampshire; Simon Howard, Crewe; Paul Jordon, Pontefract, West Yorkshire; N Blundell, West Derby, Liverpool; Lee Jackson, West Bromwich, West Midlands; J M Maybury, Walsall, West Midlands; K Sonubi, Derby; Colin McAlister, Ballycastle, County Antrim, Northern Ireland; Andrew Long, London E8; Carolyn Lamb, Rochdale, Lancashire; Darren Williams, Spennymoor, County Durham; David Ames, Richmond, North Yorkshire; Paul Donough, Clevedon, Avon; W O R Benoy, Bury St Edmunds, Suffolk; D Hindle, Ulverston, Cumbria; James Wolfe, Evesham, Worcestershire; Phil Thornley, Tyldesley, Manchester; James Davey, Tonbridge, Kent; Michael Park, Scarborough, North Yorkshire; David Balmer, Gateshead, Tyne and Wear; Stephen Wade, London E8; Matthew Hill, Harlow, Essex; R Armstrong, Ealand, South Humberside; Jennifer Strom, Amlwch, Anglesey, Gwynedd; John Parkinson, Rotherham, South Yorkshire; Charles Harbour, Robertsbridge, East Sussex; Christine Brierley, Swindon, Wiltshire.



# Sinclair upgrade for easier access

THE QLKIT, the toolkit from Sinclair Research, has at last been announced.

For £29.95 the QL owner gets a package of nearly 60 routines which have been written by QDOS author Tony Tebby. They include a full screen editor, which is a welcome replacement for the inflexible line editor which resides in the machine, alternative character fonts and extended EXEC commands which allow programs and jobs from QDOS to be chained.

QLKit also provides easier access to the operating system. Pipes, such as those to be found in the Unix operating system, can be used to provide communication between programs, job control is made simple and routines have been included for memory management.

Other releases from the company include the standard specification for QL floppy disc interfaces and a QDOS programming manual.

The manual includes information necessary for programmers to get to grips with Tony Tebby's operating system. It costs £14.95 and will be available from Camberley.

## Assembler price cut

THE Metacomco Assembler Development Package has been enhanced and its price dropped.

A linker has been added to enable assembler modules and user code to be chained together. Existing users will be able to obtain the upgrade for a sum which is as yet unspecified. The company says, however, that any charge will be nominal.

Metacomco hopes to draw a new type of customer with the price cut from £59.95 to £39.95. The company says that the new price will make the product more accessible to the growing number of home users of the QL.

## Big storage squeeze

THE STOP storage optimiser, from Digitex, will compress your microdrive files to as little as half their original size.

Digitex says that STOP, which is supplied on microdrive, will work on text files and data of any size; it makes the process of backing-up files easier and will work with any QL compatible software.

The optimiser uses a simple process. It reads the microdrive file, calculates the best practical way of condensing it and then produces another file which is about half the size of the original.

STOP is recommended for use on large text files, Basic programs, word processor documents and data files. Digitex warns that it is not intended for use on code files, such as machine code.

The program can be obtained for £17.95 from Digitex Computers.

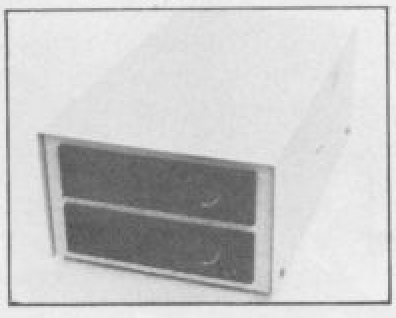
## First of the floppies?

A FLOPPY disc interface to supplement the Sinclair microdrives has been launched by Computamate.

The Q-Disk interface is available from WH Smith for £149.00. It is easy to plug in, says the manufacturer, and uses the RAM expansion slot at the left-hand side of the machine.

The operating system software which drives the product was written by QDOS author Tony Tebby. It uses the official Sinclair floppy disc format and is compatible with all software written for the QL. The company says that several companies have shown interest in putting new software on disc using the system.

As well as manufacturing the interface Computamate provides disc drives for the QL. A dual 5¼in. unit with a capacity of 400K is available for £459.00. The 3¼in. single drive costs £299.00. Both will accept double-density floppies.



# Initial releases

QL INTEGRATED Accounts, from Sagesoft, forms the centrepiece of a range of five new releases from Sinclair Research.

The package will retail at £89.95, a quarter of the amount charged for the program on other systems.

The other packages include **Cash Trader, Decision Maker, Program Planner** and **Touch and Go.**

**Cash Trader,** at £69.95, is the second major string in the Sinclair bow. Together with the accounts package it will provide a powerful money management system for the small business man or for large companies with low staffing levels and many interests.

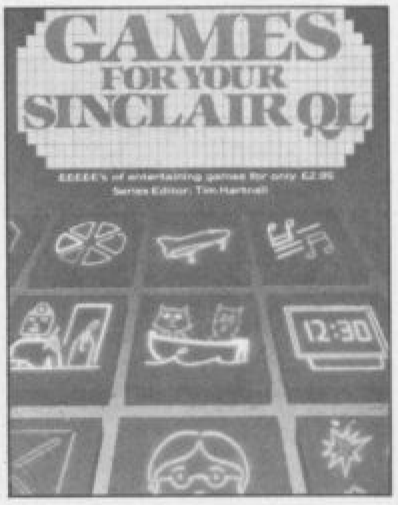
**Decision Maker** and **Touch and Go** were written by Triptych. The latter provides an easy introduction to the QL keyboard and aims to make you as familiar with it as possible. **Decision Maker** provides answers to questions which you do not want to ask yourself.

## Hartnell's handy books

"PROGRAMS of originality and quality for all the family" are promised by Virgin Games in its new book of listings by Peter Shaw.

*Games for your Sinclair QL*, edited by Tim Hartnell, provides 20 games which you can type into the QL and retails at £2.95. Programs include Nimrod, Clock, Worms and Buzz-phrase generator.

Hartnell has also launched his own book of listings and explanations. *Tim Hartnell's QL Handbook* retails at £7.95 and includes routines to produce a version of the programming language Logo, a section on creating adventures and programs to allow you to define your own character sets.



# FIRST

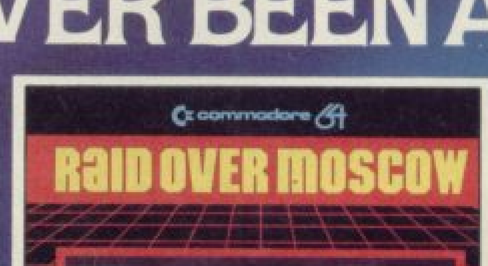
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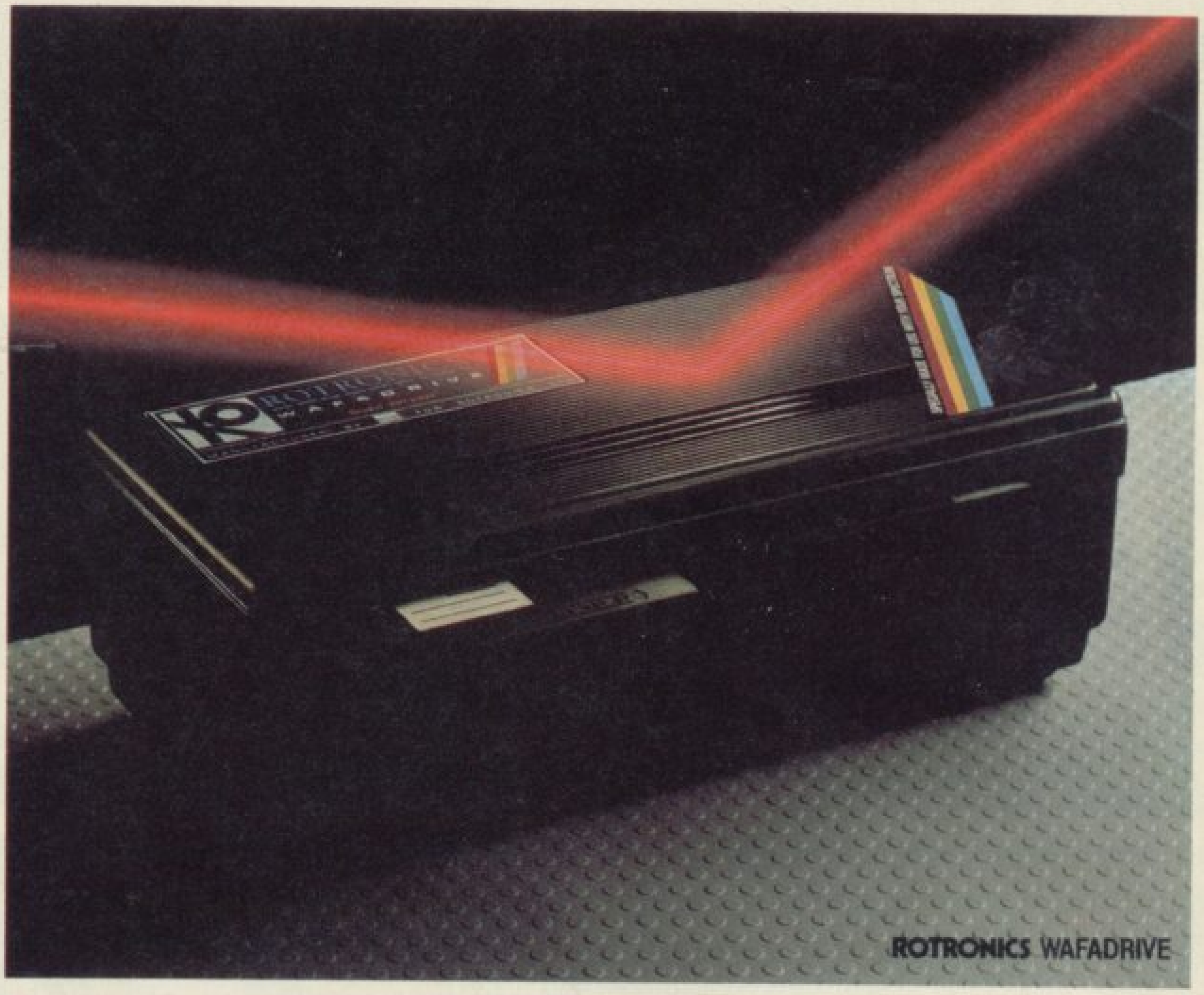
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The Wafadrive is a complete system which contains the micro interface, two 128K drives, RS232 and Centronics ports, all in one attractively-styled, compact unit. There is a minimum of connecting leads and no extra boxes to clutter the desk top. Like the majority of professional systems, the units are dual drive. This offers the optimum balance between system flexibility and cost. Built-in serial and parallel interfaces allow the direct connection of just about any popular printer.

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# Clive eats pub curry

SIR CLIVE has added fisticuffs to his already formidable verbal arsenal of offensive weapons against business rivals. You will have read already of the bust-up before Christmas at a Cambridge pub. Gremlin however is delighted to bring you an account of the proceedings as described by a short, stout, inebriated eye-witness who has been held incommunicado for the past three months pending negotiations with the Gremlin slush fund.



Jack 'Business is War' Tramiel, having just bought Atari, explains the technology behind the company's latest word processing package.

The microworld's answer to Frank Bruno stormed through the doors of the *Baron of Beef*, elbowed his way through the crowd and slapped Acorn supremo **Chris Curry** about the head with an open hand, reports our informant — a closed fist being, of course, illegal in all-in wrestling. Curry, who has already taken an early bath at Clive's dive – Gremlin, January — dragged the enraged tycoon behind a partition where a frank and candid exchange of views took place.

**Slugger Sinclair** then reappeared, holding Curry in the notorious twisted-ear-grip, now outlawed from the ring, and waving the Acorn advertisement which had offended him. He introduced Curry to the assembled drinkers as a 'very silly little boy' or words to that effect. Whereupon both corners retired to an exclusive wine bar, *Shades*, to continue their negotiations.

Those expecting a rematch at Big Uncle's New Year's thrash, to which Curry was invited, were disappointed. The two are reported to have spent an amicable evening together at the same table. Another guest was the landlord of the *Baron of Beef*, Bob 'they are both respected customers of mine and I have no further comment' Wass. Perhaps Sir Clive is beginning to learn something about the gentle art of public relations . . .

Not everybody talks with his fists, however. One Alan Osborne, currently squatting in Amsterdam, has been writing letters to various magazines complaining that his Commodore 64 game **Havoc** has been ripped off for the Spectrum and generally abused in the process. Osborne wants everybody to boycott the Spectrum version, which reviewers agree is eminently avoidable.

**Dynavision**, which publishes both versions, now hopes to receive a letter from Alan declining to accept royalties for the Spectrum version. What, and spoil all the fun? . . .

Spoiling all the fun for **BBC** owners is journalist Mike Cook of *Micro User*. Answering a reader's problem, he advised that a particular error message meant the machine was about to explode. Hundreds of owners of the swanky Beeb — a machine for social climbers if ever there was one — displayed their collective genius by believing the joke. One housewife dunked hers in a bucket of water, which must have done wonders for the notoriously slow tape-load system . . .

The two-part *Masquerade* spin-off **Hare-restorer** refuses to give up the ghost. **Haresoft**'s prolific PR agency are now claiming the boring brainteaser is being bought by schools "to involve pupils in developing computer logic skills". "We couldn't make an awful lot of sense of it," says headmaster Peter Holman. "I think most schools bought **Hareraiser** to try and win the £30,000 for their school. That's certainly why we had a look at it."

Gremlin thanks Peter for his comments, and Jeff Lubbock at Haresoft for arranging the interview. Better luck next time, Jeff . . .

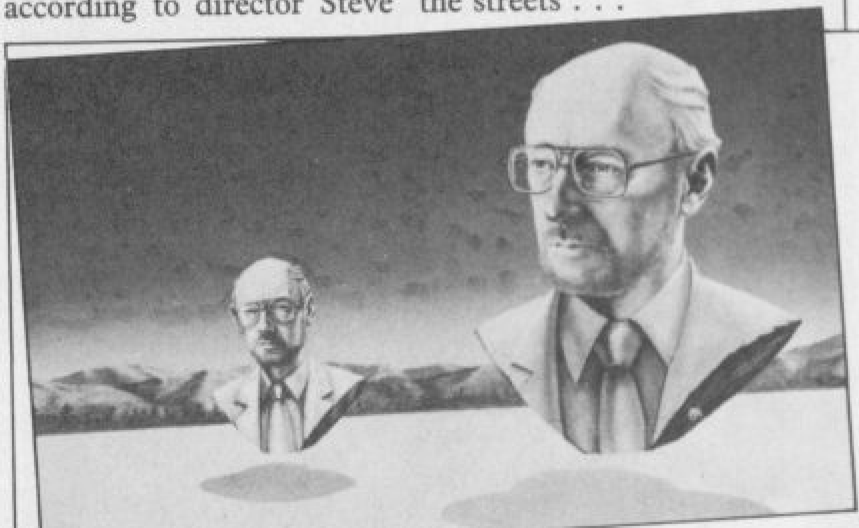
**Brazen Backslappers of the Month** award goes to **Imperial Software,** responsible for **Empires,** the intergalactic yawn that needs at least four Spectrums to play at a rate of one move per forty minutes.

Players are said to be "in the grip of a galactic cult", according to director Steve Baker. He also says he "receives phone calls every day from nuts", which speaks for itself, really . . .

Also speaking for himself is programmer Don Priestley, who wrote **Minder** for **DK 'tronics.** To himself as well, to judge from the three pages of drivel emanating from his 'seminar' on the game. We are told that TV spinoffs are encouraging programmers to develop new forms of Artificial Intelligence. Priestley says he's not sure what AI is, but whatever it is, Minder has got it . . .

They call it the electric slipper down at **Sinclair Research** when Slugger isn't listening. The excitingly named **C5**, the ZX-80 of the motoring world, may yet refute cynics and scoffers, but so far automobile expert **Sir Clive** has declined to drive his electric trike through the London traffic to demonstrate its roadworthiness.

What Gremlin would like to know is, when is **Kempston** bringing out a joystick interface to replace those dreadful handlebars? And, given a name like C5, what was so awful about the first four models? A million unsold copies of **Driller Tanks** to any reader who can answer these burning questions about the finest washing machine ever to hit the streets . . .



Huge killer busts of Sir Clive roam the countryside seeking out the organisers of the Quickbyte awards. Sinclair won the We Acquire Software Titles Earnestly award for its acquisition of the Imagine mega-con Banderbotch.

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| PHYSICS<br>7 programs<br>TOTAL<br>140k | reflection, wavelength and frequency, refraction, lenses, the eye and its defects, diffraction, colour, magnetism, motors, Ohm's law, amps, volts, series, parallel, electronics, heat, gas laws, energy forms, specific heat, kinetic energy, half-lives, atomic structure, radiation, isotopes, Newton's laws. | Spectrum 48k<br>BBC model B<br>Commodore 64 | ✓ |
| BIOLOGY<br>6 programs<br>TOTAL<br>120k | plant and animal cells, genetics, inheritance, reproduction in man, asexual and sexual reproduction, flowering plants, photosynthesis, osmosis, transpiration, transport, bacteria food classes, diet, alimentary canal, respiration, excretion eye, skin, nervous system, ecosystem, food cycles, fungi earthworm, amphibians, birds, mammals, response. | Spectrum 48k<br>BBC model B<br>Commodore 64 | ✓ |
| COMP. ST.<br>7 programs<br>TOTAL<br>140k | data collection, coding, storage, processing, presentation, validation, d.p. systems, privacy, security, hardware, I/O devices, software, low and high level languages, machine-code, assemblers, interpreters, compilers, errors in programming, aids to debugging, microcode, machine organisation. | Spectrum 48k<br>BBC model B<br>Commodore 64 | ✓ |

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# GCE TUTORING DEPT.a

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# Pirate bashing is puritanical

THE rather sanctimonious letter of Andrew Turek bemoaning children who copy programmes because they can't afford the originals — January *Sinclair User* — should be taken with a pinch of salt, because of what he left unsaid.

If it is wrong for children to "pirate" games, can the often extortionate prices charged by some software houses be morally defensible?

Most people I see buying games programs in Telford are children, and the attitude pervading part of the industry is summed up in a short story by Robert Heinlein — *The Man Who Sold The Moon* — in which two rather dubious characters say ' ". . . I want an angle to squeeze dimes out of school kids, too." . . . "Why stop at a dime?".'

An old business maxim is 'charge what the market will bear.' School-child piracy indicates that the price is generally higher than the market will bear, but that greedy or stupid software makers will not see it. Some houses have and are to be praised.

Perhaps children are not the willing dupes that the 'adults' — and I use the word with reservations — controlling some software houses seem to hope, and will refuse to use their pocket money to subsidise the financial aspirations of people who want to get rich very quick.

Could Mr Turek please explain the difference to readers of *Sinclair User* between a software house deliberately setting out to market a copy of a board game without first bothering to obtain the permission of the legitimate copyright holders, and a school child who makes one copy of a game for a friend?

The answer is, of course, that the software house hires an army of lawyers to prove why they should be allowed to pirate other people's work.

Right and wrong exist for people who make things as well as for those who use them, and it is high time that everyone realised that.

**Martin Scholes,**
**Telford, Shropshire.**

IN REPLY to the comments on pirate-copying, may I say that here in Zimbabwe there is really no other way of obtaining games but by copying. There are no personal computer stores here, so we have to order from Britain or South Africa.

However, we are only allowed an allowance of Z$360 — which is about £200 — per person, per year. We must live on this when we go on holidays outside the country. That amount must also be used to buy hardware and software. If you do you have to pay a 69 per cent customs tax. A Spectrum bought privately here, with no extras, costs Z$800.

**Jonathan Waters,**
**Harare,**
**Zimbabwe.**

## New improved print driver

WHILE agreeing with all that is said in your review of the Print-SP, Spectrum Centronics Interface — January, Hardware World — we feel that the heading of 'New COPY causes corruption' is confusing if not misleading. May we point out what your reviewer has very correctly said, that if the printer driver routine has already been loaded then a NEW command should not be executed.

We have accepted his constructive criticism and Print-SP is now supplied with a second printer driver routine which resides above RAMTOP.

Print-SP is meant to be a low cost, utilitarian unit. Those who want a sophisticated unit will have to wait a few weeks longer for our Polyprint which displays and prints in up to eight languages.

**L Dicks,**
**Cambridge Microelectronics,**
**Cambridge.**

## Up against a brick wall

I HAVE **Knight Lore** from Ultimate but I find it very hard. I can't get over or around walls.

**Peter McCabe,**
**Basildon,**
**Essex.**

● *Try standing on one of the objects which you have collected, not forgetting to pull it up after you as you jump over.*

## Reviews are influential

I FIRST bought *Sinclair User* six months ago, before I bought my Spectrum. Using the ads and features I was able to plan ahead, and know exactly what I wanted from my machine and the software available.

My favourite section is Spectrum Software Scene because you show an exact copy of the tape on the TV screen, one thing that put me off buying **TLL,** by Vortex.

Good luck in the future with your mag. You've got it right.

**S P Strong,**
**Betws-y-coed,**
**Gwynedd.**

## Last word on Sabre Wulf

I AM just writing to update the **Sabre Wulf** affair.

I finished the game on a much earlier date than June 7, in fact before it was made generally available. My dad, who owns a software shop in the Outer Hebrides, was given a pre-production copy.

I decided that five minutes work was not worth writing about, until now.

I claim to be mega super incredible amazing wonderful **Sabre Wulf King.**

P.S. I finished (my first go) with a score of 300 (clocked 8 times) and 99%.

**Jeremy Gilder,**
**Beaconsfield,**
**Buckinghamshire.**

# Hewson's prompt

THE REPLY given by Andrew Hewson to Mike Hughes' query — January 1985 — is unnecessarily complicated. The query concerned the suppression of the "start tape and press any key" prompt when saving multiple program parts. In fact this can be achieved by a simple POKE before each Part which is to be saved, POKE 23736,181.

In a program the line which does all the saving would look something like

5000 SAVE "TITLES" DATA A$(): POKE 23736,181: SAVE "AUTHORS" DATA B$(): POKE 23736,181: SAVE "SUBJECT" DATA C$()

It is not advisable to put the Poke before the first item to be saved otherwise the SAVE would start without warning. Once the SAVE is underway then all the parts would be saved continuously. Note that all parts of the program, the screen display, the variables and machine code can be saved by this method.

**John Bloxham,**
**Stratford-upon-Avon,**
**Warwickshire.**

*more letters on page 20*

# Faulty interface was reviewed

I WAS most concerned to hear from one of our many satisfied customers that your review in Hardware World of the AGF Protocol 4 joystick interface which appeared in the January *Sinclair User*, described certain operating problems with regard to the card programming system and controller movement response times.

Those problems are obviously the result of a defective unit and not a mode of operation which we would expect any of our customers to tolerate and I am most surprised that your reviewer considers those to be normal operating conditions.

I do note, however, that your tests were carried out on a pre-production unit and whilst I appreciate that your evaluation has to be based entirely on what you are given, it concerns me that much time and effort can be spent developing a product whose reputation can be instantly marred by comments which might be best levelled at the originator first in order to assess their validity. That would avoid misrepresentation and also a possible lack of credibility of reviews when users find that listed faults do not exist on their units.

Concerning the comment regarding limited life of membranes, regardless of our well-founded confidence in this proven technology, a quick calculation reveals that, even considering the worst possible parameters of operation, a card can be inserted 274 times a day over a period of 10 years without any adverse affect to the switching characteristics of the membrane. It is as well to remember that membranes are now widely used in keyboards which receive fairly constant operation — inserting and removing program cards is done relatively rarely.

The use of membrane switching on the Protocol 4 is a contributing factor to our 18-month guarantee on the product as it greatly enhances the reliability of operation.

In closing, I would suggest your reviewer should return his interface for immediate replacement as that is what we would expect anyone to do if any of our products fail to operate correctly.

**A G Fosberry,**
**AGF Hardware,**
**Bognor Regis,**
**West Sussex.**

## Allophones explained

IN reply to Declan Grady — Letters, January — full information on the SPO256-AL2 allophone set can be obtained from Maplin's Project Book Six. It contains a section called 'Allophone Speech Synthesis Technique' including information on the allophone names and length, sound, values in decimal, hex and oct.

It is available from Maplin Electronic Supplies, PO Box 3, Rayleigh, Essex SS6 8LR. Price 70 pence plus 50 p&p.

**Rex Perkins,**
**Watford,**
**Herts.**

## The meaning of the word

AS AN ex-university lecturer with 10 years of research into computer languages and their implementation by code generation and interpretation, I must take issue with a statement in your magazine that Metacomco have produced the first 'true compiler' for the QL — *Sinclair User* January 1985.

Computer One has been selling a Pascal compiler for the QL since late summer. In fact we were the first company to sell a range of languages for the QL. Although our compiler produces a fast compact version of P-code which is subsequently interpreted this is still a 'true' compiler implementing full Pascal. You would have been more accurate to say their BCPL compiler was the first to produce 68000 machine code.

**Hamish I E Gunn,**
**Technical Director,**
**Computer One,**
**Cambridge.**

● *John Gilbert replies: While agreeing with Mr Gunn that the Metacomco compiler could be more accurately described as producing 68000 code the term 'true compiler' has become a loose one meaning 'a package which generates true machine code'. If my use of this term has misled any readers then I can only apologise to Computer One.*

## High-score scaremonger

I CLAIM to have the highest score on **Hunchback,** to be the first person to finish **Beach-Head,** and **Ghostbusters.**

On **Hunchback** I scored 1,800,900. I bought **Beach-Head** on the morning of December 8 and finished it after one hour. I finished **Ghostbusters** on my sixth attempt, on December 24.

In the latter, when you reach the Temple of Zuul, you must avoid the Marshmallow Man and close the portal to the spirit world. When you do this, it gives you an account number. I have $22,600, and my account number is 11527002.

**Miles Sturt,**
**Horsham,**
**West Sussex.**

## Call for a ZX-81 club

HAVING read Robert Tempest's letter in the December 1984 issue of *Sinclair User*, concerning a general lack of ZX-81 software and features, I can only give my wholehearted support to his points of view.

However, as I am not one to sit around and complain, I should like to suggest to Mr Tempest and the many, many other frustrated ZX-81 users, that they should band together to form some sort of national, postal, users' club for owners of that excellent little machine.

If there is anyone out there who has similar thoughts on the matter then please write to me.

**Iain Dale,**
**78 Cobden Street,**
**Thornaby,**
**Stockton-on-Tees,**
**Cleveland, TS17 7ET.**

## In defence of dirt

I AM writing in protest against your unfair review of **Travel with Trashman** in your December edition. Despite your reviewer's shocked attitude, I went out and bought it, and it turned out to be a very good purchase. I agree that Jerusalem and Benares are in bad taste, but the rest is tremendous.

I have managed to complete, in one game, all the screens except Kanyu, where the irksome little guy with the spear manages not only to bump into me, but also to out-run me. There are also various interesting 'things' on each screen. For instance, has anyone tried going into the large, dark arch on Moscow, the little hut doors on Kanyu, or behind the set of steps in Madrid?

**Nick Liassides,**
**aged 15,**
**Worthing, Sussex.**

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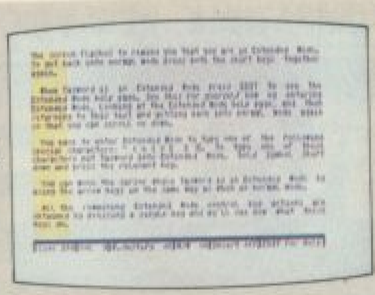

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## Tasword Two word processor



Turns your ZX Spectrum into a high-quality word processor!

Tasword Two has all the essential features of professional word processing packages – move and copy, insert, margin settings, 'help' pages, find and replace, and much more.
Written by Tasman Software Ltd.
Usual price (RRP): £13.90.

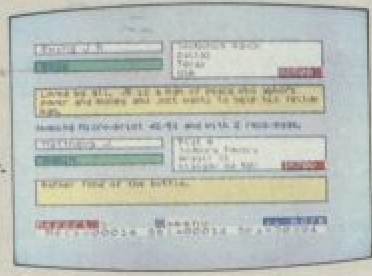
## Games Designer



Now, all you need to create original games are original ideas – and Games Designer! It has eight, very different, pre-programmed games for you to play as they are – or modify out of all recognition!

There's never before been an easier, more enjoyable, way into games design.
Written by Quicksilva Ltd.
Usual price (RRP): £14.95.

## Masterfile filing system



Address lists... personal files... stock inventories... stamp or album collections... club records... recipes ...if you can file it, you can Masterfile it!

Masterfile is a menu-driven filing and retrieval system of immense power. Display formats are user-defined, so the range of applications is enormous.
Written by Campbell Systems Ltd.
Usual price (RRP): £16.95.

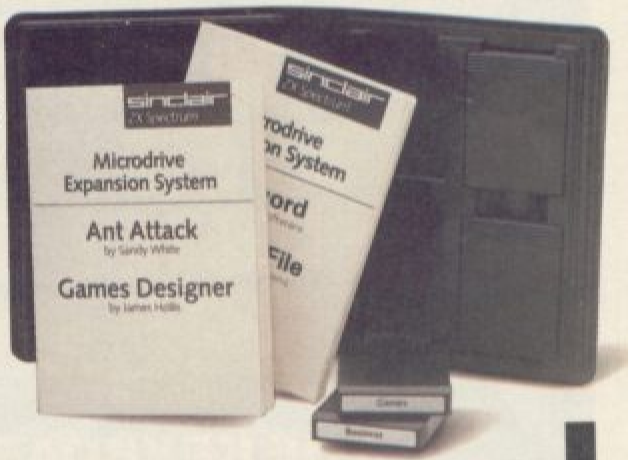
## Ant Attack



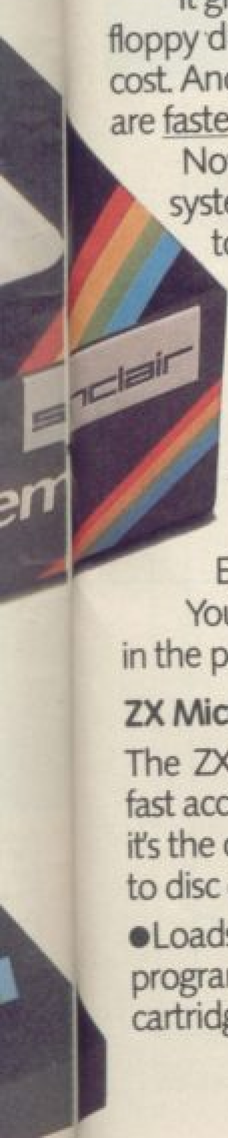
The all-time classic 3D strategy game. Ant Attack combines stunning Escher-like graphics with fast-moving action and a real tactical challenge.

Your task is to enter the walled city, seek out your captured partner, and escape. At all times you can choose from four angles of view. But beware: the city is patrolled by giant ants...
Written by Quicksilva Ltd. Usual price (RRP): £6.95.

*All programs run on a 48K Spectrum or Spectrum +. Recommended retail prices are for each program on cassette.*




# ...includes this great set of Microdrive programs!



The unique ZX Microdrive system sets the Spectrum apart from all other home computers.

It gives you all the advantages of floppy disc drives – at a fraction of the cost. And tests show the Microdrives are <u>faster</u> than some disc drives.

Now, the complete Microdrive system comes in one package – together with four of the best-ever Spectrum programs, on Microdrive cartridges.

This software alone would normally cost you over £50. Yet the Sinclair price for the complete ZX Spectrum Expansion Pack is just £99.95!

You'll find full details of its contents in the panel opposite.

### ZX Microdrives–another Sinclair first!

The ZX Microdrive is a revolutionary fast access / mass storage device. And it's the only truly affordable alternative to disc drives ...

- Loads or saves up to 85K of program or data from Microdrive cartridges.
- Just 3.5 seconds to access a typical file.
- Only 9 seconds to load a typical 48K program.

### The ZX Microdrive cartridge – a unique storage medium.

Smaller than a matchbox, the ZX Microdrive cartridge packs in a massive amount of data and programs.

Each Microdrive cartridge holds at least 85K bytes of data or programs (that's 30 pages of A4 text). And you can store up to 50 different data files per cartridge, identified by titles of your choice.

Every cartridge comes in its own protective case. Simply remove the cartridge, slot it into the Microdrive, and it's ready to use.

### ZX Interface 1–adds powerful new capabilities to your Spectrum.

ZX Interface 1 connects to the back of your Spectrum and controls up to 8 Microdrives. (Additional Microdrives are available for £49.95 each.)

It also gives you:

- An RS 232 interface – to link your Spectrum with full-size printers, other computers using RS 232 (the industry-standard interface) and provide data transmission over telephone lines, via modems.
- ZX Net – lets you set up a local area network of up to 64 Spectrums, for high-speed data communications between you and Spectrum-owning friends.

### At your local Sinclair stockist–today!

The ZX Spectrum Expansion System adds an exciting new dimension to Spectrum and Spectrum + computing. At £99.95 it's superb value too.

To find out more, call in at your local Sinclair stockist now!

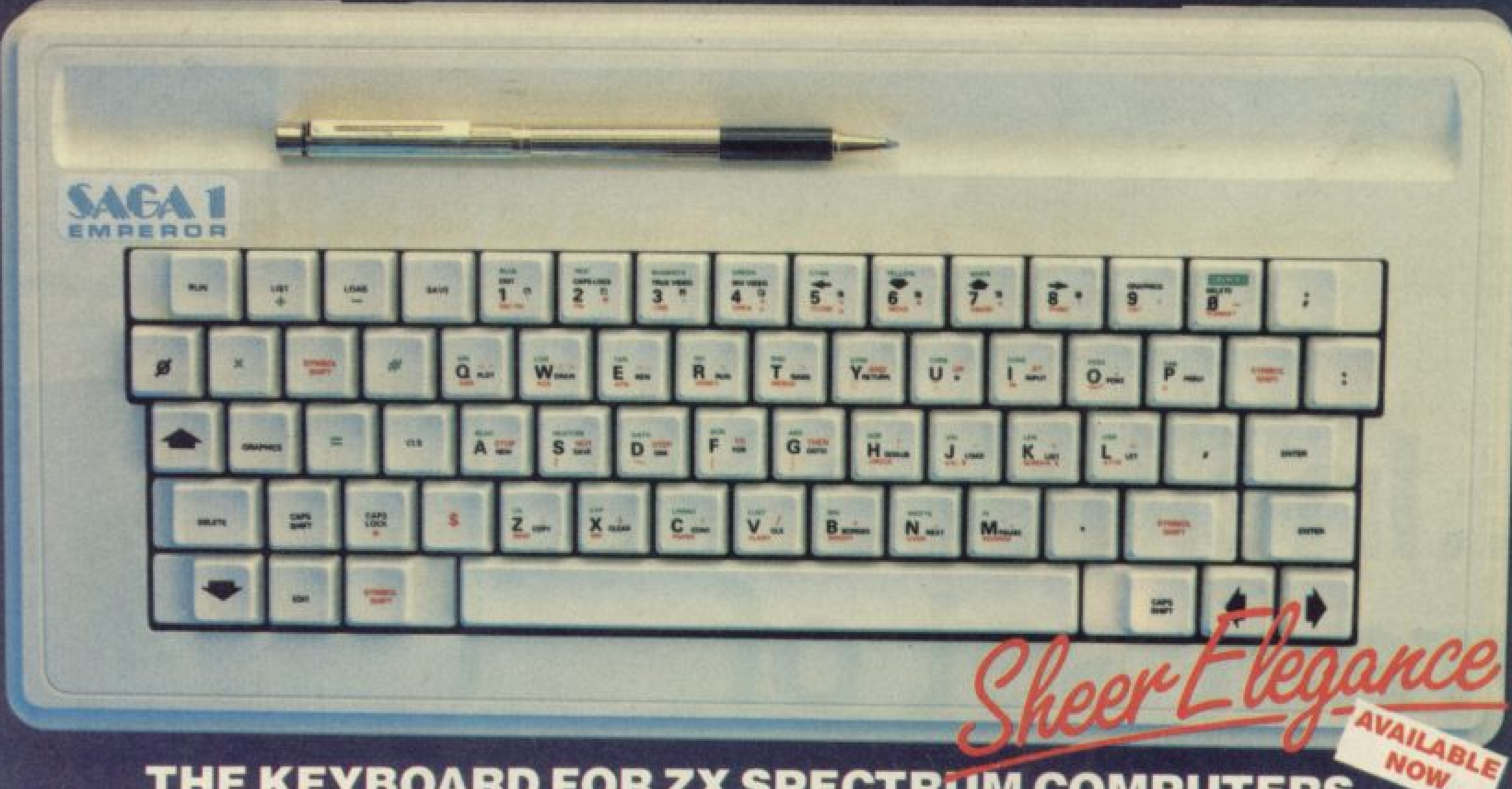
Sinclair Research Ltd,
Camberley (0276) 685311.



sinclair

**STOP PRESS: SAGA 1 EMPEROR NOW SPECTRUM + COMPATIBLE. NEW PRICE £49.95 (Please state model)**

# SAGA 1 EMPEROR




## THE KEYBOARD FOR ZX SPECTRUM COMPUTERS

* **EASY FITTING**
* **PLEASURE TO USE**
* **LONG LASTING**

The Saga 1 Emperor, equipped with 67 keys, is a carefully designed replacement keyboard incorporating many special functions for the popular Spectrum Computer. For business or pleasure, the Emperor will make your computing time more productive and enjoyable. The SAGA 1 Emperor will enable you to use the Spectrum as a powerful programming tool easier and faster.

The style is easy:- for your benefit, the SAGA 1 Emperor has been designed to ensure that available Spectrum Peripherals will fit in the usual manner.

The assembly of the keyboard is simple — and fast. No soldering required, so that within just 5 minutes you can replace your current ZX Spectrum with the new SAGA 1 Emperor.

AND ALL THIS FOR JUST £54.95 (inc. VAT)

**SAGA P.C.!**
Your very own Personal Carrier, partitioned to neatly accommodate your Spectrum, Saga 1 Emperor and peripherals; Tape Recorder, Power Supply, Cables, manuals and cassettes. Of solid and attractive construction the P.C. is ideal for storing and transporting your computer accessories. The case uses a strong double stitched and bound Black Calf Vinyl with a tough thick ABS inner compartment, leather buckles and a strong handle. Only **£26.95** (inc. VAT).

**DUSTCOVER**
Another top quality product, this expertly produced long-lasting bound and sewn dustcover has been specifically designed for the SAGA 1 Emperor, which will keep everything looking neat and dust free. Only **£4.95** (inc. VAT).




**SOUNDBOOST**
Hear that keyboard click
with a SAGA SOUNDBOOST
The SAGA SOUNDBOOST is a tiny electronic circuit which considerably enhances the sound volume and quality of the Spectrum sound output. Adjustable from a whisper to a roar, the SOUNDBOOST provides added realism and excitement for games players and security for programmers (Hear that Keyboard Click!). No cutting, no soldering — just connect.
Only **£9.50** (inc VAT).

**FLEXICABLE**
Developed to relieve your Spectrum from the pressure of life, to fit your Spectrum and your add-ons taking the load with ease. By popular demand we now have two versions of the 9 inch FLEXICABLE available to suit your needs.
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**Female-Female FLEXICABLE — £9.50**
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All prices include VAT
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# More from DK stable

AS ONE of the oldest suppliers of add-ons for the Sinclair market, DK'tronics has built up a reputation for good, basic, hardware. The latest additions to its range for the Spectrum — two joystick interfaces, a printer interface and a sound generator — do not break any new ground but are well designed and constructed.

All use a new, restyled, case which can be used with the Spectrum Plus and should also fit most full-sized keyboards. In addition, three of the four items have through connectors — a welcome change.

The less expensive joystick interface is Kempston/Sinclair compatible. It has two standard joystick sockets on the top, the left Kempston and the right Sinclair — keys 6, 7, 8, 9 and 0 for fire. Priced at £13 it should prove popular with arcade fanatics. It does not have a through connector, and thus must be the last add-on attached.

For those who need a wider choice of keys the programmable interface at £22.95 could be the answer. It can be programmed using the tape provided or, when a game is running, via a switch on the top. The tape allows you to program any of the keys, including Shift and Enter, and to read two or more keys at once, so you can move diagonally and fire at the same time.

The printer interface is disappointing. It can drive any Centronics printer but it has disadvantages which make it a doubtful buy.

The software tape provided has two pieces of code on it, one for Epson compatibles and the other for the MCP 40. The Epson code is only 520 bytes long and redirects LPRINT and LLIST to the printer. A copy routine is included but only in one size and, when tested on an Epson printer, appeared to give a line feed which was out by 1/72in. The bottom two lines of the screen are not copied. The MCP code is 680 bytes long and includes a half-sized copy option as well as supporting the INK command.

For MCP 40 users the interface might well be a good buy at £39.95 but Epson or Seikosha users who want to use COPY should look carefully before buying.

The Sound Generator, priced £29.95, is based around the ever popular AY-3-8912 chip and includes a built-in amplifier and external speaker; it also amplifies the BEEP. The problem with this chip is that it is not one of the easiest to program, although thorough instructions are included that show you how to do this in Basic or code.

To overcome that, software is included on tape which allows you to write a tune in three-part harmony and replay it. You cannot alter the length of note — you have to enter two notes to double the length — nor edit a voice once it is entered; you are limited to 256 notes per voice.

The chip has 15 envelopes built in and a different one, and/or noise, can be assigned to each voice. That, again, is rather basic and reflects the age of the chip.

Although the chip is well known the problem has always been lack of support from software writers. DK'tronics is well placed to change this and some future releases will contain routines to drive the generator.



# Low cost for high quality print

A PRINTER is a major expense for most computer users but a number of low cost printers are becoming available. The Fastext 80 by Smith Corona is classed as a budget, Centronics, printer but it has most of the features you are likely to need. RS232 is an optional extra.

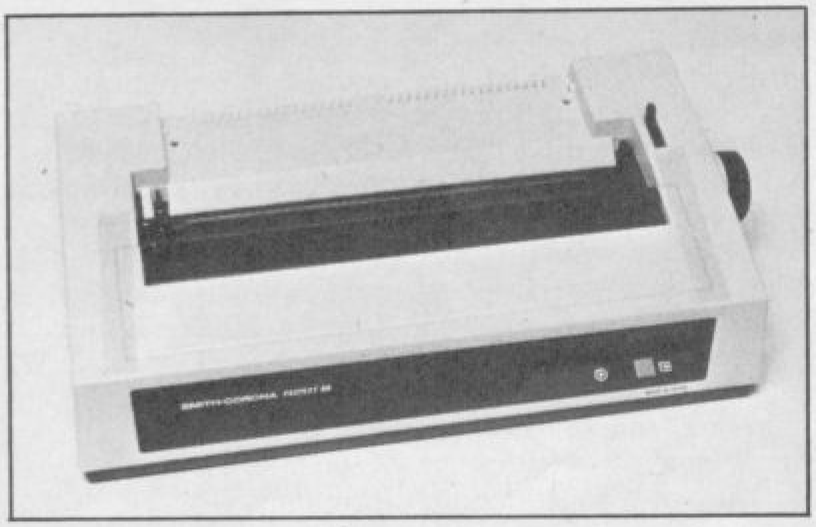
As well as normal-sized text you can print in Condensed, elite or enlarged type — all with true descenders, change the international character set, underline characters and change the line spacing and form length. An automatic line feed can be set using the single DIP switch on the back of the printer and in graphics mode you can print up to 576 dots.

The standard printer can accept paper up to 10in. wide and a tractor feed can be added for fan-fold paper. The friction feed works tolerably well but snags, occasionally. At normal print size it prints at a fast 80 cps.

With all that it should be a reasonable buy but there are problems. The first are the instructions. The initial setting up is well documented but the list of control codes is poorly laid out and is a mine-field for newcomers. Although the codes are Epson compatible the common DCA is replaced by ESC W, ESC J executes at n/72 rather than n/216 and ESC C only operates on the number of lines.

The front panel has only an on-line button, line feeds and form feeds have to be sent by software or by using the manual knob. There is an LED to show if you are on-line but there is 'no end of paper' warning.

All the above could be forgiven if the printer were competively priced, but at £224.25, plus £17.25 for a tractor feed and £8.20 for extra ribbons, it is not. For the same price you can get an Epson RX80 which has a proven track record and cheaper ribbons.



*more hardware on page 26*

# Tactile teacher

FOR MANY applications the standard QWERTY keyboard is far from ideal. The Touchmaster, from Touchmaster Ltd, is one way to make data input easier.

It is a pad with a flat surface on which, as you draw, the position of the pen is returned to the computer. By using a number of different overlays different parts of the pad can be made to represent different things and so the keyboard can almost be dispensed with.

The Touchmaster is sold as a complete package of pad, power supply, stylus, interface and a drawing program. Interfaces are available for a number of computers — Spectrum, BBC, Commodore 64, VC, 20 and Dragon — so if you change your computer you need only a new interface. As the package costs £149.95 that is a definite advantage.

The Spectrum interface is a standard black box which fits flat into the user port. An extension edge connector is provided on the back and a 3ft cable connects to the parallel socket on the pad. The pad also has a serial connector, possibly useful for a QL version, and a socket marked 'Foot Switch' but there is nothing in the instructions about that.

The drawing program, called Multipaint, has a number of features but does not compare too well with other drawing programs. On the plus side, apart from entering text and loading the program, the keyboard does not have to be used, which consequently speeds drawing. When drawing freehand you can alter the 'brush' to give different thicknesses and styles.

The usual facilities of filling areas, drawing circles, boxes and polygons and changing the attributes are available. You can load and save screens but for some reason that facility could not be made to work. What it lacks are the grid overlays, magnification, scrolling and flipping of the more comprehensive programs. You can only draw on the top 22 lines of the screen and, as there is no grid on the pad overlay, you can easily lose your position.

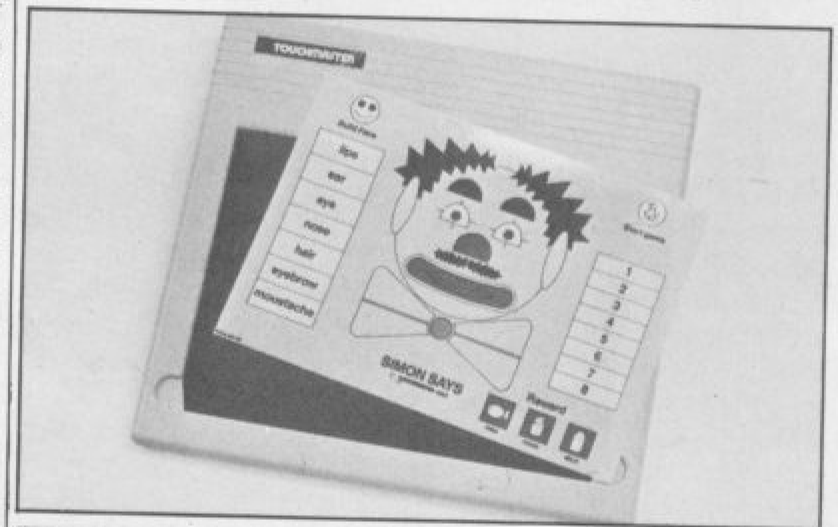
Touchmaster sells a number of other programs for use with the pad.

Of the three we look at — **Simon's Shapes, Simon Saw** and **Simon Says** — only the last one would hold a child's attention for long.

**Simon Saw** entails finding the correct jigsaw pieces to make a picture. If you succeed you can feed the cat. In **Simon Says** you build up a cartoon style photo-fit face. The computer then moves randomly some of the features and you have to repeat the sequence. You do that by pressing either the feature or the word on the pad. Then you get to feed the by now grossly overweight cat.

Although the instructions say you can run the Touchmaster using your finger, instead of the stylus, it needed more pressure than a small child could give. That may be because it was new but try one out if you are buying for your children.

The only comparable product to the Touchmaster is the British Micro Graphpad. The Graphpad is about £6.00 cheaper and has a superior drawing program but can not be swopped from one computer to another and, as yet, does not have any additional software. If Touchmaster can improve the quality of the software it could better realise its potential. Touchmaster Ltd, PO Box. 3, Port Talbot, West Glamorgan, SA13 1WH.




# Assistant aid pack

IT often seems that the only qualification you need to work in a computer shop is a complete lack of knowledge about computers. How often have you asked an assistant a question, other than the price, to be told "I think it uses something called Basic", "it's got nice graphics", or "the expert will be in after school"? Help is at hand.

Stephen Adams has brought out a pack with which all the shop assistant has to do is plug it in the back of a Spectrum and turn on. The computer will then cycle through seven screens which show what it can do. The display is simple but it is better than being greeted by a row of blank screens in a store, simply because the assistant does not know how to load a program.

Further details of the unit, priced £50 plus VAT, from Stephen Adams, 1 Leswin Road, London N16 7NL. A customising service is also available.

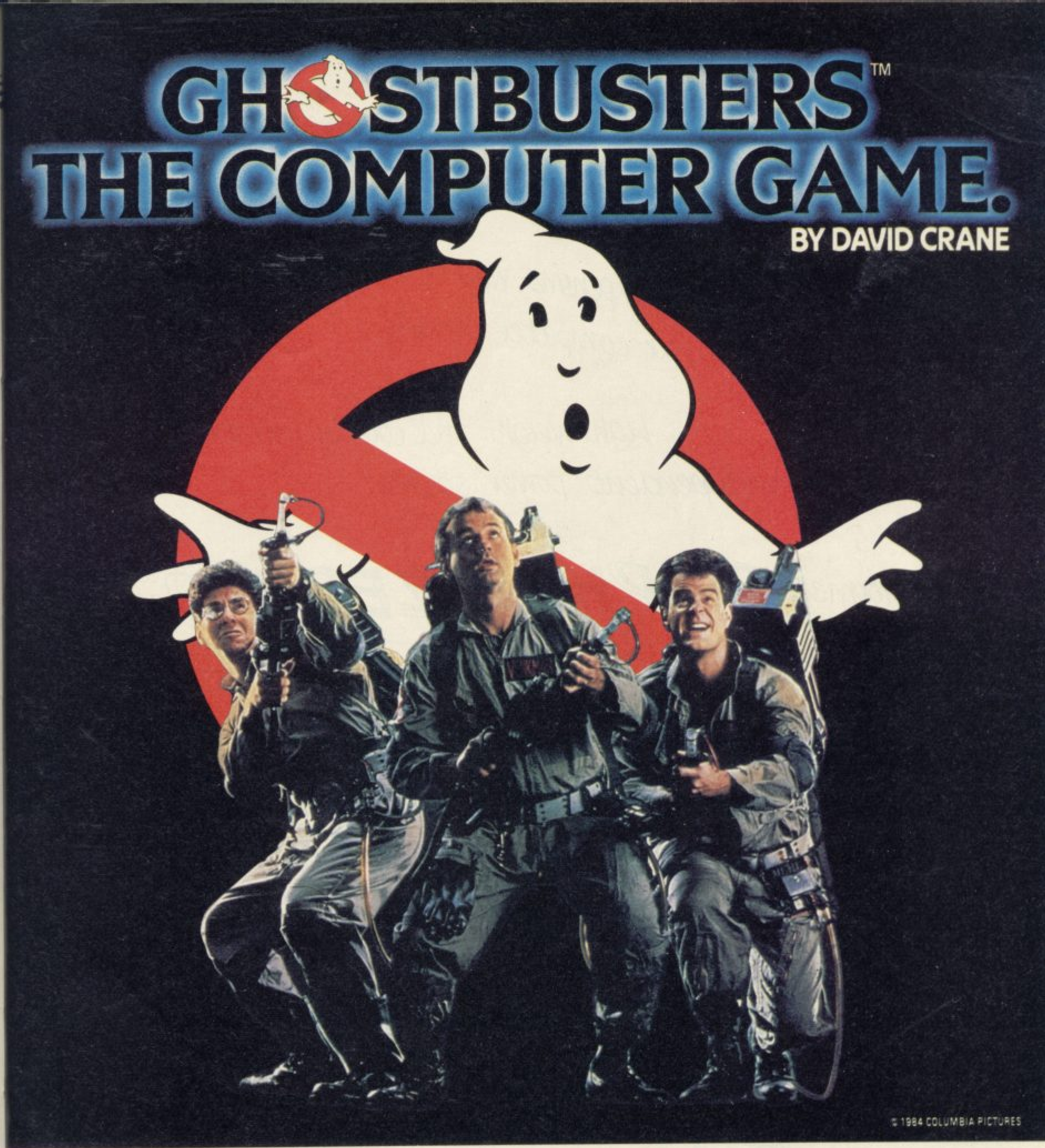
# Get turned on to reset

ONE advantage of the Spectrum Plus over the Spectrum and ZX-81 is the inclusion of a reset switch. That saves a lot of wear and tear on the power socket which, if it becomes too worn, can lead to reliability problems.

To save you the trouble of making your own switch, two companies, Yewser Friendly Products and Computerworld, have brought out their own. Both consist of the inevitable little black box, into which the power lead is plugged, a push switch, an LED indicator and a lead to the computer.

The push switch on the YF unit turns the power on and off — like the switch on a bedside lamp — while that from Computerworld requires a simple push to break contact. Neither of the units is a substitute for a mains on/off switch but both are convenient and simple to use.

Priced £5.45 for the Spectrum version, £4.95 for the ZX-81, plus 70p postage, the Yewser Friendly switch can be obtained from 7 Thames Street, Hampton, Middlesex TW12 2EW. Computerworld at 208 Kent House Road, Beckenham, Kent at £4.99 for a Spectrum unit.




Yes. Ghostbusters is a computer game, too.

The game play follows the film with incredible accuracy. Even down to the chart-topping music score.

Your task is to rid the world – and in particular New York City – of a cataclysmic plague of ectoplasmic nasties.

Play it well and we give you a Ghostbusters franchise – with your own secret account number. Use this number and the money it brings you, to buy the same ghost busting gear they had in the film. (Don't worry – we'll give you some money to get started.)

You will have earned it. And you can use it to go to undreamed of levels. Don't try to use someone else's number, we'll find out.

From then on, it's you against the ghosts. All the way to the Temple of Zuul.

Where the final battle begins...

Designed by USA's David "Pitfall II and Decathlon" Crane and running on Commodore 64 cassette and disk and Spectrum. Coming soon on other systems.

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**Your computer was made for us.**

AVAILABLE FROM SELECTED BRANCHES OF BOOTS, WH SMITH, JOHN MENZIES, LASKY'S, SPECTRUM, RUMBELOWS, WOOLWORTH AND GOOD COMPUTER SOFTWARE STORES EVERYWHERE.



Really inexpensive way of writing down whatever comes up on your computer screen.

Lightweight and totally portable — independent power source!

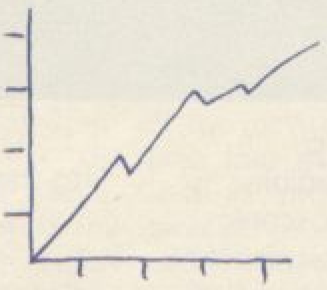
Normal, **EMPHASIZED**, CONDENSED and ENLARGED print.

Works perfectly in the dark even during a power cut!

45 characters per second (only in optional "totally-illegible-squiggly-line" mode).

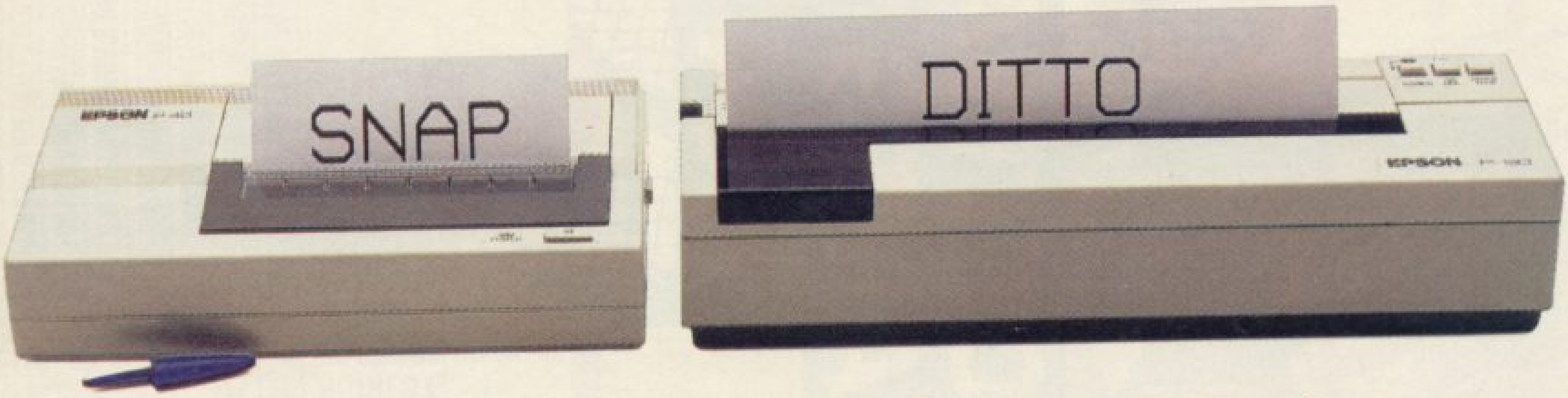


DO



ICS.

Dear Me,
Even writes letters!




# The New Epson Portable Printers.

Now the home computer user can have a true business quality printer, from Epson – maker of the world's most popular computer printers.

Our new P40 and P80 are only £99.95 and £184 respectively – and that's including VAT and mains recharger. They're suitable for BBC, Sinclair, Commodore, Oric and almost any other popular home computer, as well as virtually any portable or desk top micro.

Running off their own rechargeable batteries as well as mains, they're totally portable and being Epson, an absolute doddle to use. And while the P40 is particularly compact it too gives you 80-column width printing in condensed mode.

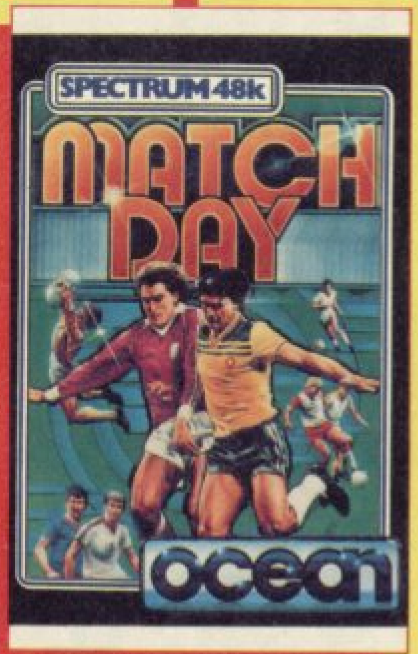
So wherever and whenever you want to print, now you can – with the new Epson portables. In fact, anything a ball-point does they can do – better.

Ring 01-200 0200 for details.

EPSON

# DAILY Mirror — sinclair user

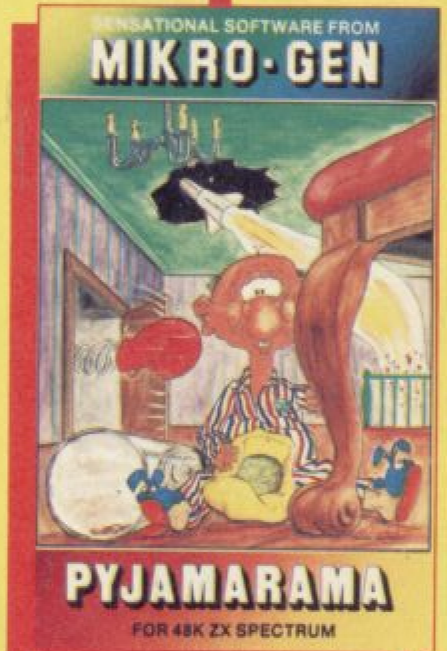
# TOP 30 SOFTWARE GAMES OF 1984

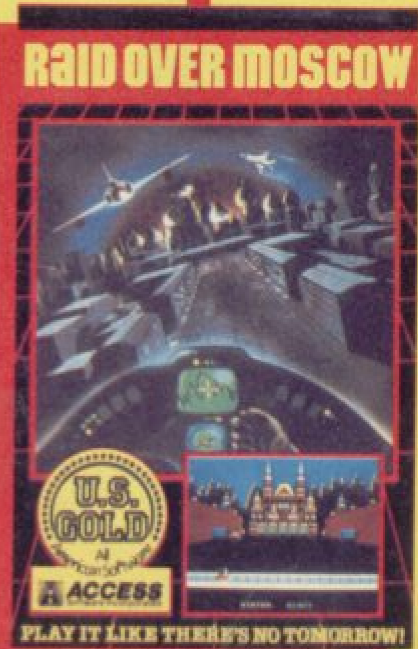




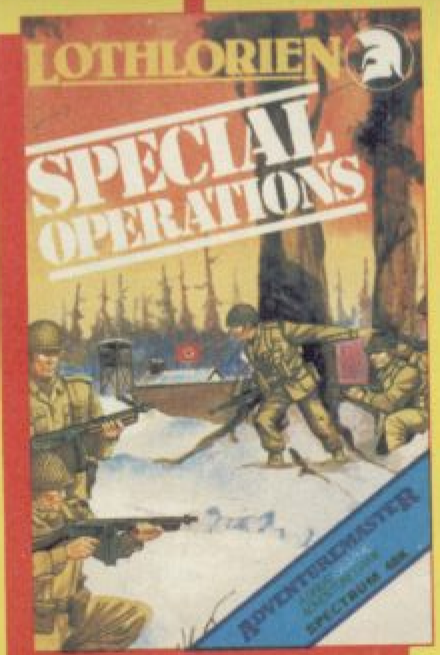


| POSITION | HIGHEST POSITION | WEEKS IN CHART | TITLE | Publisher | Computer | SPECTRUM | VIC 20 | CMMDRE 64 | ELECTRON | ATARI | DRAGON | ORIC | BBC | OTHER |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | (Also Available on) | | | | | | | | |
| 1 | 1 | 19 | JET SET WILLY | SOFTWARE PROJECTS | SPECTRUM | ● | | ● | | | | | | |
| 2 | 2 | 16 | FIGHTER PILOT | DIGITAL | SPECTRUM | ● | | | | | | | | |
| 3 | 2 | 16 | MANIC MINER | BUG BYTE/SOFTWARE PROJECTS | SPECTRUM | ● | | ● | | | | | | |
| 4 | 1 | 10 | SABRE WULF | ULTIMATE | SPECTRUM | ● | | | | | | | | |
| 5 | 1 | 8 | DALEY THOMPSON'S DECATHLON | OCEAN | SPECTRUM | ● | | ● | | | | | | |
| 6 | 3 | 12 | CODE NAME MATT | MICROMEGA | SPECTRUM | ● | | | | | | | | |
| 7 | 5 | 11 | TRASHMAN | NEW GENERATION | SPECTRUM | ● | | ● | | | | | | |
| 8 | 2 | 10 | FULL THROTTLE | MICROMEGA | SPECTRUM | ● | | | | | | | | |
| 9 | 2 | 10 | TORNADO LOW LEVEL | VORTEX | SPECTRUM | ● | | | | | | | | |



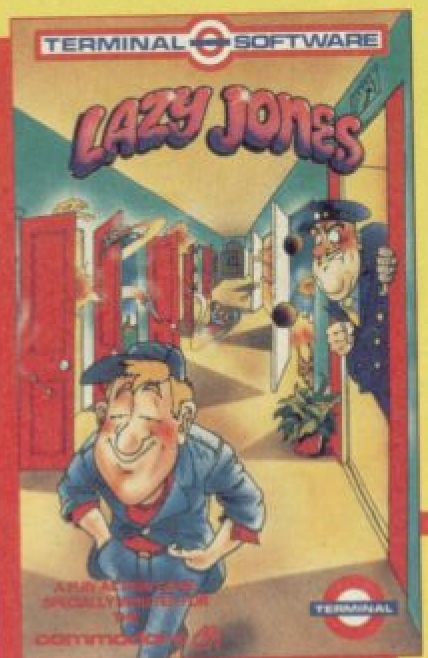



| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 2 | 10 | TORNADO LOW LEVEL VORTEX | SPECTRUM | ● | | | | | | | | |
| 10 | 3 | 11 | NIGHT GUNNER DIGITAL | SPECTRUM | ● | | | | | | | | |
| 11 | 2 | 12 | CHEQUERED FLAG PSION | SPECTRUM | ● | | | | | | | | |
| 12 | 3 | 10 | PSYTRON BEYOND | SPECTRUM | ● | | ● | | | | | | |
| 13 | 6 | 10 | LORDS OF MIDNIGHT BEYOND | SPECTRUM | ● | | | | | | | | |
| 14 | 4 | 8 | HUNCHBACK OCEAN | SPECTRUM | ● | | ● | | | ● | ● | | |
| 15 | 3 | 6 | WANTED: MONTY MOLE GREMLIN GRAPHICS | SPECTRUM | ● | | ● | | | | | | |
| 16 | 11 | 9 | BLUE THUNDER WILCOX | SPECTRUM | ● | | ● | | | | | | |
| 17 | 7 | 8 | JACK & THE BEANSTALK THOR | SPECTRUM | ● | | | | | | | | |
| 18 | 4 | 8 | MUGSY MELBOURNE HOUSE | SPECTRUM | ● | | | | | | | | |
| 19 | 6 | 6 | BEACHHEAD ACCESS/U.S. GOLD | SPECTRUM | ● | | ● | | | | | | |
| 20 | 6 | 5 | MATCH POINT PSION | SPECTRUM | ● | | | | | | | | |
| 21 | 7 | 8 | BLADE ALLEY PSS | SPECTRUM | ● | | | | | | | | |
| 22 | 8 | 8 | SCUBA DIVE DURRELL | SPECTRUM | ● | | ● | | | | | | |
| 23 | 8 | 6 | JET PAC ULTIMATE | SPECTRUM | ● | | | | | | | | |
| 24 | 9 | 9 | ALCHEMIST IMAGINE | SPECTRUM | ● | | | | | | | | |
| 25 | 7 | 6 | HOBBIT MELBOURNE HOUSE | SPECTRUM | ● | | ● | | | | | | |
| 26 | 7 | 4 | MICRO OLYMPICS DATA BASE/MICRO USER | SPECTRUM | ● | | ● | | | | | ● | |
| 27 | 3 | 5 | ANT ATTACK QUICKSILVA | SPECTRUM | ● | | | | | | | | |
| 28 | 6 | 3 | PYJAMARAMA MICRO GEN | SPECTRUM | ● | | | | | | | | |
| 29 | 5 | 3 | SHERLOCK HOLMES MELBOURNE HOUSE | SPECTRUM | ● | | | | | | | | |
| 30 | 12 | 4 | KOKOTONI WILF ELITE | SPECTRUM | ● | | | | | | | | |

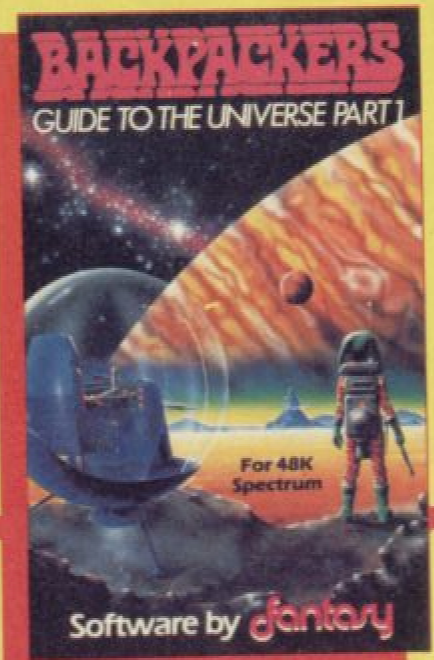








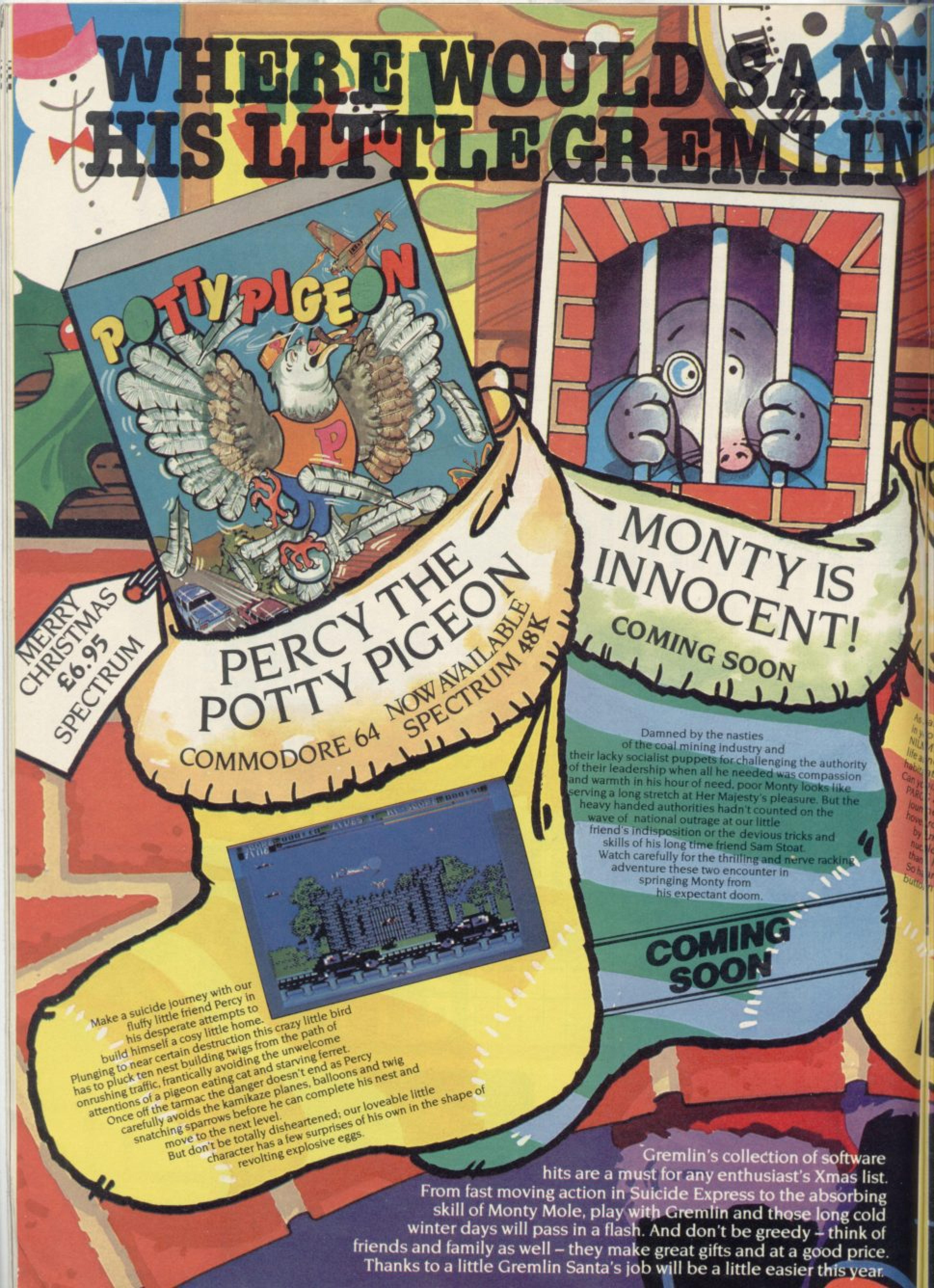

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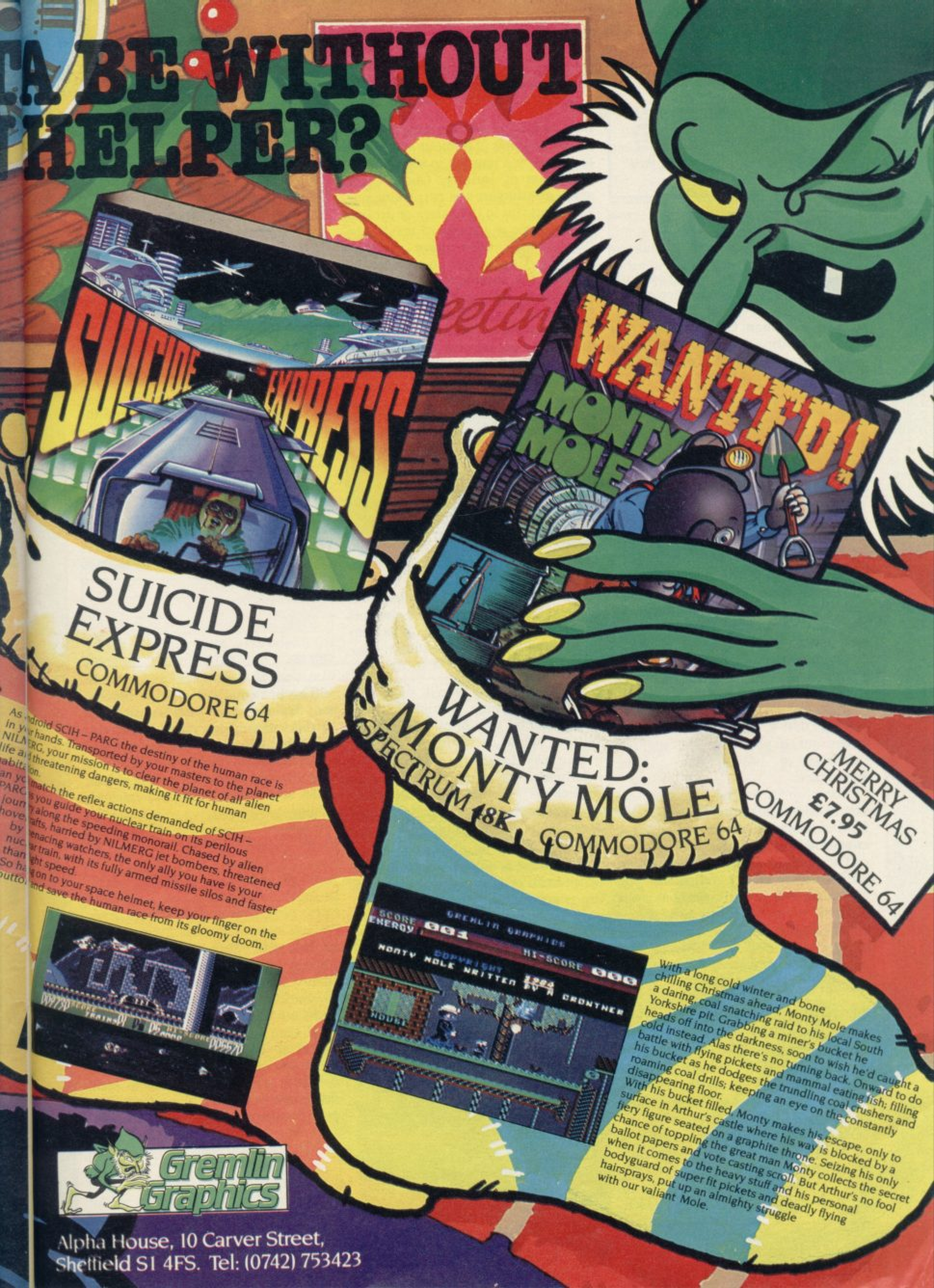




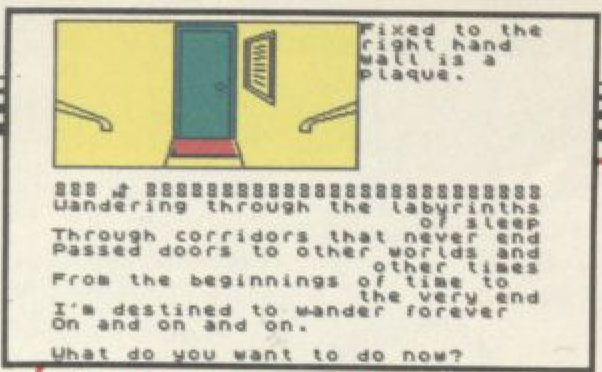




WHERE WOULD SANT
HIS LITTLE GREMLIN
POTTY PIGEON
MERRY CHRISTMAS £6.95 SPECTRUM
PERCY THE POTTY PIGEON
NOW AVAILABLE SPECTRUM 48K
COMMODORE 64
MONTY IS INNOCENT!
COMING SOON
Damned by the nasties of the coal mining industry and their lacky socialist puppets for challenging the authority of their leadership when all he needed was compassion and warmth in his hour of need, poor Monty looks like serving a long stretch at Her Majesty's pleasure. But the heavy handed authorities hadn't counted on the wave of national outrage at our little friend's indisposition or the devious tricks and skills of his long time friend Sam Stoat. Watch carefully for the thrilling and nerve racking adventure these two encounter in springing Monty from his expectant doom.
COMING SOON
Make a suicide journey with our fluffy little friend Percy in his desperate attempts to build himself a cosy little home. Plunging to near certain destruction this crazy little bird has to pluck ten nest building twigs from the path of onrushing traffic, frantically avoiding the unwelcome attentions of a pigeon eating cat and starving ferret. Once off the tarmac the danger doesn't end as Percy carefully avoids the kamikaze planes, balloons and twig snatching sparrows before he can complete his nest and move to the next level. But don't be totally disheartened; our loveable little character has a few surprises of his own in the shape of revolting explosive eggs.
Gremlin's collection of software hits are a must for any enthusiast's Xmas list. From fast moving action in Suicide Express to the absorbing skill of Monty Mole, play with Gremlin and those long cold winter days will pass in a flash. And don't be greedy – think of friends and family as well – they make great gifts and at a good price. Thanks to a little Gremlin Santa's job will be a little easier this year.



A BE WITHOUT
HELPER?
SUICIDE EXPRESS
WANTED! MONTY MOLE
SUICIDE
EXPRESS
COMMODORE 64
As android SCIH – PARG the destiny of the human race is in your hands. Transported by your masters to the planet NILMERG, your mission is to clear the planet of all alien life and threatening dangers, making it fit for human habitation.
Can you match the reflex actions demanded of SCIH – PARG as you guide your nuclear train on its perilous journey along the speeding monorail. Chased by alien hovercrafts, harried by NILMERG jet bombers, threatened by menacing watchers, the only ally you have is your nuclear train, with its fully armed missile silos and faster than light speed.
So hang on to your space helmet, keep your finger on the button and save the human race from its gloomy doom.
WANTED:
MONTY MOLE
SPECTRUM 48K COMMODORE 64
MERRY
CHRISTMAS
£7.95
COMMODORE 64
With a long cold winter and bone chilling Christmas ahead, Monty Mole makes a daring, coal snatching raid to his local South Yorkshire pit. Grabbing a miner's bucket he heads off into the darkness, soon to wish he'd caught a cold instead. Alas there's no turning back. Onward to do battle with flying pickets and mammal eating fish; filling his bucket as he dodges the trundling coal crushers and roaming coal drills; keeping an eye on the constantly disappearing floor.
With his bucket filled, Monty makes his escape, only to surface in Arthur's castle where his way is blocked by a fiery figure seated on a graphite throne. Seizing his only chance of toppling the great man Monty collects the secret ballot papers and vote casting scroll. But Arthur's no fool when it comes to the heavy stuff and his personal bodyguard of super fit pickets and deadly flying hairsprays, put up an almighty struggle with our valiant Mole.
Gremlin Graphics
Alpha House, 10 Carver Street,
Sheffield S1 4FS. Tel: (0742) 753423




## The Sandman Cometh

ARE YOU lying comfortably? A little sand in your eyes and across the border of sleep you go.

**The Sandman Cometh** takes you into the shifting regions of the unconscious. Freud, Lewis Carroll and Herman Hesse are thrown together with liberal helpings of humour and fantasy to offer you a journey in search of the Hourglass of Infinity. Ghost trains, spies, gunslingers and perplexing puzzles await you in the palace of dreams.

The game is a standard text adventure with unobtrusive location graphics. Unusually, you are provided with the full vocabulary of the game if you care to ask for it. There are two 48K games on the cassette but you must obtain your 'ticket number' from the first to get into the second.

The adventure is attractively presented and the difficulty of the tasks and problems is progressive, so much so that you will soon find your head swimming. The concept is imaginative and allows the game to contain a number of different settings. Each is self-contained but you will need items from one scenario to help you in another.

*Richard Price*

**THE SANDMAN COMETH**
**Star Dreams**
Memory: **48K**
Price: **£10.95**
Gilbert Factor: **7**

## Gift from the Gods

BENEATH the legendary palace of Mycenae, where Agamemnon the conqueror of Troy was horribly murdered by his wife Clytaemnestra, are vast labyrinths. Gates lead from one multi-tiered section to the next.

In **Gift from the Gods** you are cast as Orestes, son of the dead king. Your task is to collect certain geometric shapes from rooms within the maze and place some of them in their correct arrangement inside the chamber of the Guardian. Only then is escape possible.



Your sister Electra will help you if you can locate her, whilst the shade of Clytaemnestra will attempt to destroy you by reducing your stamina.

The graphics are well made and the figure of Orestes walks and flies realistically. Technically an excellent production, but it does seem rather short on events. You can wander around the maze for quite a time with little happening to provide interest.

**Gift from the Gods** is a curate's egg really: long in technical merit, short on excitement.

*Richard Price*

**GIFT FROM THE GODS**
**Ocean Software**
Memory: **48K**
Price: **£6.90**
Gilbert Factor: **6**

## Espionage

GET YOUR O Level chemistry text-books out if you have the slightest intention of buying and playing **Espionage**.

The posh packaging may well lead you to think that you are getting some kind of fancy spy adventure set in the cut-throat world of JR. No way.

The program is a set of tests about oil and its chemistry and, unless you are interested in hydrocarbons in a really heavy way, you'll soon find yourself swimming around in a big greasy mental pool of ethane, ethene, butene, butane, gasp, help.

You may deduce from errors in the information the identity of the mole in the company for which you are working. If petrochemicals are a closed book to you, this might be rather difficult.

**Espionage** is either mutton dressed up as lamb or homework masquerading as good clean fun.

The presentation is dull, the content dry and specialised and both the introductory and main programs failed to autorun. It may be useful if you want to be chairman of BP but if you just want a good time steer clear. Must rush off, my catalytic cracker's boiling.

*Richard Price*

**ESPIONAGE**
**Modular Resources**
Memory: **16K**
Price: **£8.95**
Gilbert Factor: **4**

## Assignment East Berlin

AT CHECKPOINT Charlie only the swirling mists of the sub-Le Carré spy thriller show any signs of life. Checkpoint Charlie is the crossover point from West to East Berlin. It is also the starting point for **Assignment East Berlin** from Sterling Software.

Your job is to bring back the plans for LOBOT, a brain-numbingly important radio transmitter, and you are to achieve your patriotic objective in the conventional North-South-Get-Rope-You-Are-Dead style of text adventures.

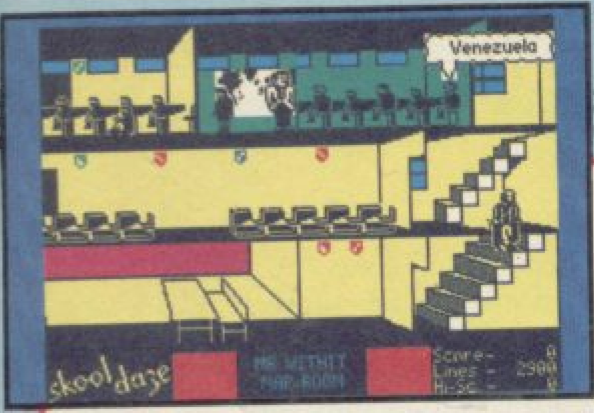
Unfortunately many of the conventional commands such as Inventory or Take are not supported, and consequently fiddling around trying to discover the correct words takes even longer than usual. Although the game is atmospheric, some of the detail is sloppy — what, for example, is a Russian guard doing manning an East German border post?

There is also a tendency to make problems unrealistic; the 'small book' turns out to be your passport, something you would know perfectly well in real life. Such tricks spoil the illusion of involvement in an adventure.

Unattractively presented on-screen, and slow to respond, the game is less good than it should be. The story is not at all bad, and the ever-present threat of capture adds to the tension. It makes no sense therefore to spoil things by lumbering the user with a poor vocabulary and slow interpreter.

*Chris Bourne*

**ASSIGNMENT EAST BERLIN**
**Sterling Software**
Memory: **48K**
Price: **£5.95**
Gilbert Factor: **3**




## Skooldaze

SKOOLDAZE explodes into the imagination with a cloud of chalk dust and a hail of catapult bullets. It is one of those rare games where nothing over-ambitious is attempted in the way of programming but all the elements unite to provide an addictive and satisfying romp.

The screen displays a school, with classrooms spread over three floors. The playing area is not large, being about three screensful of scrolling school, but the careful planning of the game allows for plenty of action.

You are Eric, a Bad Boy whose dreadful school report is locked in the headmaster's safe. The task is to get it out. Only the masters know the combination of the safe and to make them reveal it you must set all the school shields flashing by hitting them with your catapult. A nice refinement is that Mr Creak the History Master is a doddering fellow who cannot remember his part of the combination and must be forced to reveal it by writing his date of birth on his blackboard.

In between performing the quest, you must take part in the normal activities of the school — that is, playing and attending lessons. Instructions appear at the bottom of the screen and if you are caught in the wrong place by a master you will receive lines. 10,000 lines and you are sent home, and have to start again.

The characters of the game have a cartoon-style quality and represent school stereotypes — the trendy master, the bully, the tearaway and the swot. You can change the names to those of your choice which should make the game even more fun.

Whether or not you want to attempt the extremely difficult problem of cracking the headmaster's safe, **Skooldaze** is tremendously enjoyable. You can have a great time simply trying to survive, as masters dole out lines with hideous abandon and, sometimes, quite unfairly. You can have catapult fights with other boys, and if you manage to fool a master into giving the bully or swot some lines then you lose some from your own tally.

They may not be the happiest days of your life, but **Skooldaze** should provide some of the happiest hours of the day. *Chris Bourne*

**SKOOLDAZE**
**Microsphere**
Memory: **48K**
Price: **£5.95**
Joystick: **Sinclair, Protek Kempston**
Gilbert Factor: **8**

## Macman's Magic Mirror

TALK about Alice Through the Looking Glass! **MacMan's Magic Mirror** is an exploration of the world of mirror reflections, not only the relatively simple vertical mirror but also horizontal, a combination of both and diagonal.

The first problem presented is to match up pegs on the mirror screen moving MacMan around to place them. There is a time limit, but using a joystick speeds up the action. When the pegs have been matched the next task is to reproduce a simple jigsaw and then comes the really fiendish problem of repeating a mirror image of patterned blocks. The puzzle requires careful observation, not only to recognise the pattern but also to reverse the blocks to their mirror image. It can be very tricky indeed especially using the horizontal/vertical mirror.

**MacMan's Magic Mirror** provides plenty of practice in the all important skills of visual discrimination and observation of patterns in an entertaining and original way. The stated target age is four to eight but four year olds might find it rather difficult, and six to 10 is probably more appropriate. *Theo Wood*

**MACMAN'S MAGIC MIRROR**
**Sinclair Research**
Memory: **48k**
Price: **£7.95**
Gilbert Factor: **8**

## Match Day

THE CROWD rises to its feet, screaming and cheering in frenzied excitement as two international teams are heralded onto the pitch by that well known tune from *Match of the Day*.

The scene is set for the cup final in **Match Day** from Ocean — the crowd falls silent as the teams prepare themselves. The whistle blows.

The Tooting Tigers fight desperately for supremacy, but they are out of their league. The Camden Crawlers start to win, scoring goal after goal. Ten-nil to the Crawlers at half time. The Tigers seem to have lost their claws and retreat desolated to the changing rooms.

**Match Day** is viewed from the eye of the camera with the pitch scrolling from left to right. Although movement is slow there is a lot of detail in the program — your player can dribble, kick, head and throw the ball. The game includes corners and is as realistic as possible on the Spectrum.

As well as playing against the computer you can opt for a club match where as many as eight players can take part, each team playing the other through to the finals.

There is an extensive menu through which various game details can be altered — even to changing the team's name and colours.

You can control only one player at a time. He is always nearest the ball, identified when his socks turn the same colour as his strip. This places you at a disadvantage when playing the computer as the opposing team work as one to get control of the ball.



There is no sound other than the introductory tune. Strangled bleeps and squeaks filter from the computer at intervals throughout the game and sound more like a happy budgie than the grunts of the players.

It would be impossible to capture the atmosphere of football on a computer, but **Match Day** is a worthwhile attempt at reproducing a live game. If you are a football fanatic, you should enjoy this one. *Clare Edgeley*

**MATCH DAY**
**Ocean Software**
Memory: **48K**
Price: **£7.95**
Joystick: **Kempston**
Gilbert Factor: **6**

*more software on page 36*




## Ghostbusters

THE SPIRITS of Christmas just passed may not have had the pleasure of the spectres from **Ghostbusters** in December due to a late release. The ghouls have, however, finally arrived and the results of programmer David Crane's hard work are likely to pay off as it is tipped for the bestseller charts.

The game has three phases each of which includes travelling around a city capturing ghosts with the equipment bought by you with a bank loan at the start of the game.

You can also select your mode of transport, which can be anything from a compact or 1963 hearse to a high performance car which costs $15,000. As you travel around the city map ghosts will float onto the screen and possess buildings which turn red when inhabited. Your aim is get into those buildings to catch the ghosts while running over and immobilising any spectres which you might find on the way.

When you arrive at the distressed building you must drop your trap and coax the itinerant ghoulie into the path of a mechanical arm which takes a grab at it.

At any point a Marshmallow Alert may sound and you will have to press the 'B' key to trap the mallow before it marshes all over the buildings. If he escapes from your trap then the city and your score will suffer.

Scaring, sorry, scoring, is achieved in two ways. You will gain $100 for every ghost that you catch. If you attract a Marshmallowman, however, the mayor of the city will give you $2000 for your trouble.

The game draws to its conclusion when the ultimate baddies arrive at the Temple of Zuul at the centre of the screen. If you have enough dollars you can take part in the final conflict, perhaps win the game, and gain access to a secret pass number which will give you access to any other **Ghostbusters** game in the universe.

The game is not much to shout about but cannot be damned just because it emulates the plot of a film and contains nothing new. One of the more interesting features of the game is the soundtrack, coupled with a nifty voice synthesiser which insists on shouting 'Ghostbusters' and 'Behind you' in a passable immitation of Ray Parker Junior's strangled wheeze.

*John Gilbert*

**GHOSTBUSTERS**
**Activision**
Memory: **48K**
Price: **£9.99**
Joystick: **Sinclair, Kempston, Cursor**
Gilbert Factor: **7**

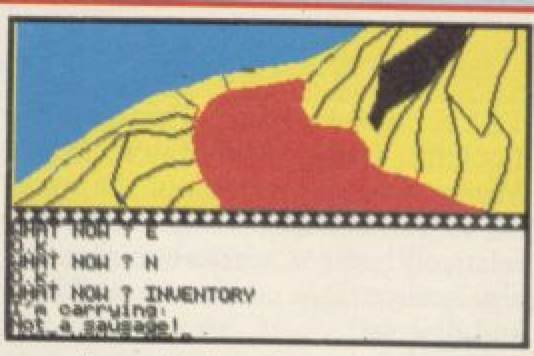
## Arrow of Death (1 & 2)

THE TWO parts of **Arrow of Death**, each sold separately, form the sequel to the tale of the **Golden Baton**. This magic object, which once brought luck to the heroic world it presides over, has now become tainted by the evil of the sorcerer Xerdon. Crops wither, the land is sick, the people murmur.

In Part One you must gird your loins and head up country to seek out the pieces of an arrow — the only weapon which will destroy the magician provided it is made of the correct materials. You begin your journey in the deserted palace where the baton throbs with malevolence and despair.

The second program is a game in its own right and needs no data from the first. In this part you have found the pieces and must now take them to the only fletcher who can make the Arrow in the correct, magical, way. He has unfortunately already been captured by the agents of the evil one, so don't expect it to be easy.

The games have similar styles and feature graphics for many locations. You can switch between the text description and the picture by using the ENTER key — though the in-




structions don't tell you that, which may confuse the unwary.

*Richard Price*

**ARROW OF DEATH (1 & 2)**
**Channel 8**
Memory: **48K each**
Price: **£6.95**
Gilbert Factor: **6**

## Se-Kaa of Assiah

EVIL rules the land — yawn — and only a hero can bring home the bacon by finding the Three Great Artifacts of Power and returning them to their rightful owners. In **Se-kaa of Assiah** you become the hero of the title — geddit? — and begin your quest in a village close to the dread castle of the Dark Ones. Enter at your peril and brave the forces of darkness.

The program is a two-part game which purports to be a text adventure with graphics. After a short foray into the fortress you will soon realise that there is precious little description or supporting text beyond your own input. The inevitable result is a featureless and empty world which fails to grasp the imagination successfully. The graphics are interesting but do not add enough to the very slim story line to hold your attention for very long.

In some ways the game might have been more likely to succeed if the




programmers had decided to make it into either a graphic monster maze type game or a pure text adventure. The concentration on slick pictures has clearly reduced the power of the interpreter and the space available for words.

Although the program is cheap adventurers still have the right to expect more than this for their money.

*Richard Price*

**SE-KAA OF ASSIAH**
**Mastervision**
Memory: **48K**
Price:
Gilbert Factor: **3**

*more software on page 38*

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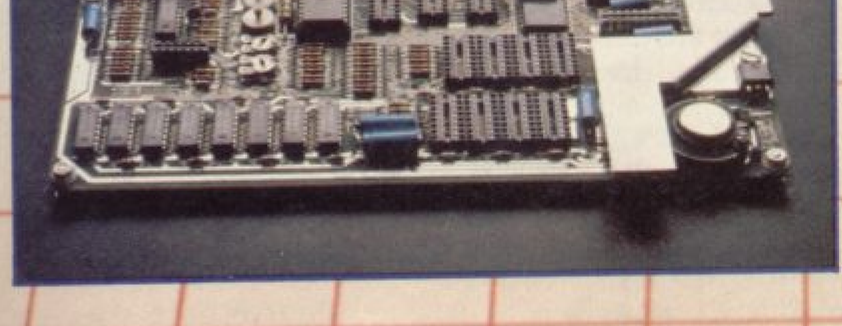



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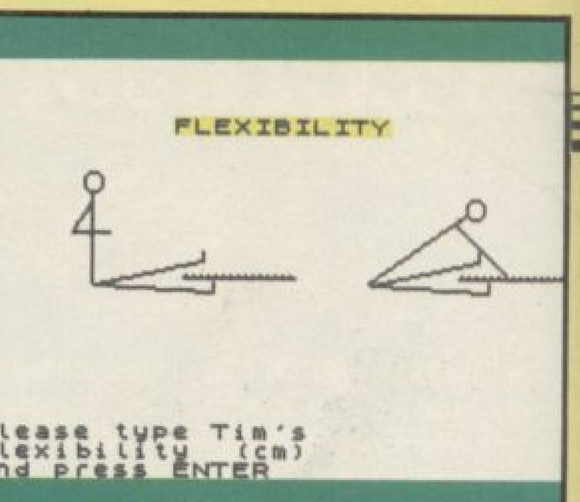
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Green Lane, Appleton, Warrington WA4 5NG

SU/12/84




## Microfitness

A DANCE and health studio based in Walsall has come up with a get-fit program aimed at computer sloths. **Microfitness** is geared to get your corpuscles moving, the program first gives you a few simple exercises to perform and then tells you how unfit you are.

Before the program can gauge your fitness level it asks you a series of detailed questions about your body's dimensions including how much extra fat you are carrying and your resting heart rate.

You then start to get physical and are given a series of simple exercise to perform. The data from these helps the computer to predict accurately your anaerobic power, muscle power and flexibility, amongst others.

A detailed booklet comes with the package giving diagrams and explanations on each exercise. To relieve the tedium of the computer screen, a line drawing of a man performing each exercise shows how it should be done. Should you find certain exercises difficult you are told in no uncertain terms to consult your doctor before continuing with the assessment.

Once your physical state has been decided, you can choose from among 54 sporting activities, those on which to base your training schedule. Those include running, jogging, windsurfing, skiing and also less strenuous sports like golf and snooker. It is difficult to imagine anyone getting fit playing snooker – unless that is, they keep well away from the beer. Having chosen your sports, you are given a strict training program designed to push you, with points being awarded at the end of each session according to how well you have done.

**Microfitness** has been well documented and all computations are based on the national norm. For those who are fitness freaks this program is a godsend – for those who are not, it might be a good idea to try it – you never know, you might end up attempting a marathon.

*Clare Edgeley*

**MICROFITNESS**
**VO²**
Memory: **48K**
Price: **£8.95**
Gilbert Factor: **8**

## Oil Strike

OIL STRIKE is a strategy game for eight to fourteen year-olds based on the oil industry search for new resources.

The action takes place on a screen grid and the object of the game is to search likely squares for supplies of oil. A player can choose to survey a square which will show the geological strata beneath and, if the survey is favourable, drilling can take place.

Drilling is not always successful as a survey may show conditions likely to produce oil, whereas in fact water is the end result. On the first two concessions squares are numbered as to their potential for oil bearing, but after that players have only the strata to guide them.

Once found the oil gushes and a production level can be set. As the months pass messages scroll up on the screen, such as 'Oil price drops', and it will be time for the budding oil magnate to reduce production.

Other messages include money spent on cleaning up the environment after an oil spill or a well has dried up. Scoring is in the form of a bank balance and a monthly totalling of income and expenditure.

**Oil Strike** is a valuable introduction to the interactive forces of the world commodities market and the language of the business world, as well as an exploration of geological maps. Its appeal lies in the strategic decision making which has to be revised continuously as world market conditions change, a heinously difficult task.

*Theo Wood*

**OIL STRIKE**
**Sinclair Research**
Memory: **48k**
Price: **£7.95**
Gilbert Factor: 8

## Airwolf

BUY the rights to a well-known TV series. Find an old game knocking around which bears a passing resemblance to the scenario. Hey presto! another spin-off is born.

In **Airwolf** you are the pilot of the eponymous helicopter which you fly through a series of scrolled scenes.




Two-thirds of the screen contains scrubs and mountains and the middle third, through which Airwolf travels, looks like a long black tunnel.

The inlay card informs you that Airwolf must rescue five scientists, who are being held in a base somewhere beneath the Arizona desert. You are not told why or by whom.

Viewers of the television series will already be familiar with *Airwolf*. The plot rotates around a slick and sophisticated helicopter which fights the baddies.

Sadly though, the arcade game is a poor substitute. The graphics are dull and the tasks uninspired. The first obstacle, a wall, appears as Airwolf shoots through the 'tunnel'. While busy destroying the wall with full firing power it starts rebuilding itself. If you succeed in demolishing that wall the next obstacle which comes into view is — yes, you guessed — a very familiar looking wall. Very imaginative.

Although there is the option for keyboard or joystick control the latter is well advised as all five keys would require simultaneous operation. The game bears a resemblence to **Blue Thunder** and is produced by the same company. This sheep in Airwolf's clothing is best avoided.

*Colette McDermott*

**AIRWOLF**
**Elite**
Memory: **48K**
Price: **£6.95**
Joystick: **Kempston**
Gilbert Factor: **3**

*more software on page 40*




## Disease Dodgers

DISEASE DODGERS is one of those programs which are much more fun than the program notes suggest. We are told that the game will show how health, diet and exercise are inter-related. It is based on this quite complex idea. You have to move the Dodger family over a series of jumps, eating food and drinking as you go along. The terrain varies and gets more awkward depending on which region of the world you are in.

The family consists of Dad, Mum, Gran, teenager and toddler. Invariably Dad has the best chance of survival, a dubious position to hold. As the dodger moves about the terrain he or she has to jump over obstacles and, if no food is eaten, gets progressively weaker. All the time various coloured blobs representing diseases attack your dodger.

The aim of the game is to build up immunity by eating the healthy foods on offer. Weight, immunity levels and survival scores are shown at the top of the screen.

Unusually for an educational game this has true arcade action. The dodgers have to take running jumps over the walls and not simply hop over them, which all adds to the motivation factor. The big problem with the game is with the graphics. Some of the foods are difficult to distinguish; for instance was that purple shape a dyed egg or an aubergine?

Despite the colour problems **Disease Dodgers** is fun to play and demonstrates the relationships stated if only on an elementary level. Certainly it is to be recommended as an alternative to the average arcade game for children between eight and 12.

*Theo Wood*

**DISEASE DODGERS**
**Sinclair Research**
Memory: **48k**
Price: **£7.95**
Joystick: **Sinclair**
Gilbert Factor: **9**

## The Great Space Race

In space nobody can hear you scream which is just as well if you intend buying **The Great Space Race.** It is one of the most vacuous products we have seen and its time that this sci-fi 'epic' was exposed as yet another dose of Legend super-hype.

The loose plot involves a race between space ships, some piloted by user-controlled characters and others by the computer, to deliver consignments of an alcoholic beverage called Natof to as many planets as possible. During the delivery runs characters may indulge in ship-to-ship laser gun butchery or lift the lid on the cargo and arrive at the next port of call in a drunken haze.

At seemingly random times during the game one of the characters may discover the code number of a booby trap bomb which has been hidden on a planet or ship. If you have time to scribble the number and location down before the information is scrolled off the screen you can defuse the bomb in the unlikely event of arriving at the location.

If the game Loads without crashing back into Basic you will immediately see the most attractive aspect of the package. The graphics in which the characters are displayed are in brilliant high resolution which is produced on the screen with the utmost professionalism.

It is, however, a pity that the programmers at Legend do not seem to be able to produce a good animated representation of a space battle. The two ships on the screen look like two mis-shaped fried eggs sliding around in a pan. Legend has taken minimal graphics to new heights.

As for playability, if you want to make a cup of tea or 'phone a distant relative in Australia you can leave the game to play with itself. As with soaps such as *Coronation Street* or *The Archers* you can go away and come back without having missed much.

It is incredible that the company which produced **Valhalla** with interactive characters and real-time action, difficult to program by any standards, could produce such a whimper after the bang. **The Great Space Race** includes real-time action but if intelli-




gent character interaction does exist within the game it must be hiding somewhere. As for the Natof, the game plays as if it was written under the influence of the stuff.

*John Gilbert*

**THE GREAT SPACE RACE**
**Legend**
Memory: **48k**
Price: **£14.95**
Gilbert Factor: **3**

## Grand Prix Manager

GRAND PRIX MANAGER heralds the return of the Toms, following a long silence after the incredibly successful **Football Manager**. Not that author Kevin Toms has written the sequel, **Grand Prix Manager**, but the game has been published by his company and is firmly based on the blend of menu-based decisions and highlights of the action which made the previous game a Spectrum classic.

Unfortunately, the simulation of life as manager of a Formula One team is far less impressive.

You must choose a driver from a short list while keeping in close contact with the sponsors. Decisions regarding the race depend on the percentage of straights and bends, weather conditions and temperature. You can decide on your tyres, their hardness and tread depth, and set the elevation of the car's spoiler.

Then you sit back and watch user-defined graphics stay motionless in the centre of the screen while other user-defined graphics whizz past them.

Written in Basic with occasional POKEs of the crazy border variety, it is a dud effort if ever there was one.

*Chris Bourne*

**GRAND PRIX MANAGER**
**Silicon Joy**
Memory: **48K**
Price: **£6.95**
Gilbert Factor: **1**

*more software on page 42*




'Engines on...check... flaps to 10 degrees... check...increase throttle, release brakes. Increase throttle to full power ...watch air speed indicator. Aircraft taxiing, increasing speed...170 knots... rotate, observe vertical speed indicator... increase elevator angle.

Take off achieved!'

The excitement of a DACC 747 take off fires the adrenalin like no other computer simulation. The 3D pilot's view and full array of instrumentation challenges you to take the role of piloting a Jumbo Jet...and once in control and taxiing down the runway, there's no turning back.

Take off achieved. Full flying control at your fingertips and seven British Airports to fly to...the drama of landing is waiting to unfold as you sit in the hot seat of a 747 flight deck.

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Cassette Price £9.95 including VAT and postage. Spectrum Price £7.95. Commodore on Disk Price £11.95.



# 747 FLIGHT SIMULATOR FROM DACC

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Tel: 092 576 2613/5930.




## Danger Mouse

DANGER MOUSE is back, fighting fit and once again ready to pit his wits against the mad Baron Silas Greenback in the Black Forest Gateau. Whoops! Chateau.

Colonel K, head of a department so secret that even he does not know its name, has sent his right-hand mouse with trusted assistant Penfold to the Black Forest to destroy the Baron's secret weapon — a Pi-beam, which poses a threat to world security. 'It should be a piece of cake', mutters Danger Mouse as they leave for Germany in the mousemobile.

Many strange adventures follow in the quest for the Pi-Beam, more than once the intrepid pair find themselves in the soup as time after time they fall into the fiendish traps set by the mad Baron.

Their immediate problem is finding a way into the chateau, preferably in one piece, and with a little ingenuity and lots of luck they start to make headway.

**Danger Mouse in the Black Forest Chateau** is an adventure game played in a multiple choice format with a number of options to choose from at every move. Your success is dependent upon learning the area and picking up the right objects and you might find it helpful to draw a map of your progress.

Nearly all the objects have some uses although you might find a few red herrings. Penfold plays his part and lets fall cryptic clues at almost every opportunity. Pay close attention to the dialogue — there is nearly always something there to help you.

The game is played in two parts, and you will have to solve the first half to gain the skeleton's secret bone number — this is a code allowing you to load part two.

Charming illustrations accompany each location. The game is fast moving with no long delays before arrival at new locations and the adventure is easy to solve. The simplicity of the game makes it ideal for young adventurers and an enjoyable break for those seasoned adventurers not wishing to expend much brain power.

*Clare Edgeley*

**DANGER MOUSE IN THE BLACK FOREST CHATEAU**
**Creative Sparks**
Memory: **48K**
Price: **£6.95**
Gilbert Factor: **8**

## Heathrow International ATC

PROBABLY the most disturbing simulation ever written has been re-released in a new improved form by Hewson Consultants. **Heathrow International Air Traffic Control** is guaranteed to dispel any idea you might have had that airports are safe places to be in.

The original program was a classic of simulation, and with the addition of Concorde flights, and a completely different version for Schiphol airport in Holland thrown in on the B side of the cassette, the new product is even more impressive.

The screen displays a radar map of the area around the airport. Aeroplanes enter the screen at any one of four stacks, points where pilots are instructed to circle until the controller brings them in to land.

It sounds easy, but it is not. The idea is to get everything moving in an orderly flow, but you only have to make one mistake to start a chain reaction leaving bits of broken aircraft strewn all over West London or the Zuider Zee. Although the program is slow, being conducted in real time, and tests you over half an hour of activity, once something starts to happen you will find it very difficult to work out the instructions for each individual aircraft quickly enough.

Although it is not the sort of thing to drive everybody wild with excitement, for those who like beating their brains into a pulp on wet weekends watching Concorde carving up the rear end of a DC10, Heathrow ATC is what they have been looking for.

*Chris Bourne*

**HEATHROW INTERNATIONAL AIR TRAFFIC CONTROL**
**Hewson Consultants**
Memory: **48K**
Price: **£7.95**
Gilbert Factor: **8**

## The Magic Sword

THE WORLD of fairy tale is married with text adventure in **The Magic Sword**, a bookware package with a format calculated to appeal to the six to eight year-old child.

The story pits Princess Poppy and Prince Fred against Bad Bertha the wicked witch and is attractively illustrated without being desperately original in content. The tale ends with the imprisonment of the princess by Bertha. At that point you load up your program and take on the part of Fred in his quest for the sword. Naturally, he must rescue pretty Poppy from her ordeal.

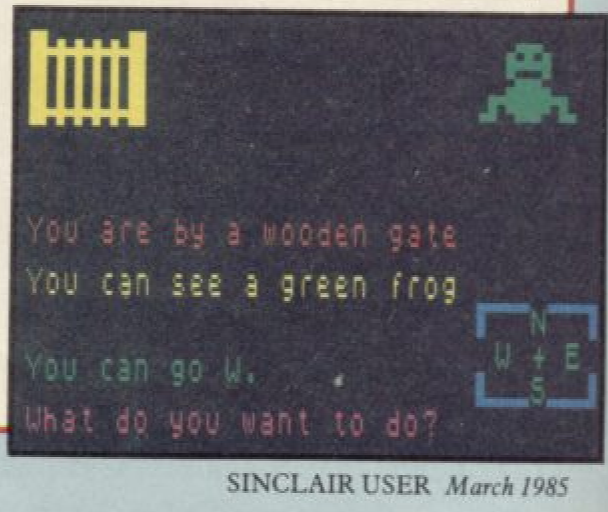
The adventure uses bright, blocky graphics and enlarged text to help the young reader. Movement and a few basic actions are carried out by single key presses. A compass flashes out the directions in which it is possible to move — a useful and sensible idea given that children of this age will have little concept of cardinal points. It is the kind of game which will probably be best played with an adult to help, at least at the beginning.

Although the package is well produced the press blurb suggests that the game is suitable for toddlers. This is definitely not the case as the reading and reasoning skills required are well beyond tinies. More sophisticated juniors might also find the story a little old hat.

Nevertheless, this is a creditable attempt to reach an age group who are rarely catered for in games computing.

*Richard Price*

**THE MAGIC SWORD**
**Database Publications**
Memory: **48K**
Price: **£8.95**
Gilbert Factor: **5**



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COMPUTER

IS AS EASY

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THIS.

Let's face it, most 'beginner's guides' are anything but easy reading.

Now Dorling Kindersley have come up with a new way of learning BASIC that's unique, simple and down-to-earth.

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Unlike ordinary guides, Screen Shot uses full-colour photographs of real computer screens to show instructions, program listings and displays.

So what you see on the screen in the book is precisely what you'll see on your own computer screen.

Which makes our programs easy to understand, easy to read and free from misprints or other sources of confusion.

The accompanying explanations are clear, practical and are written by experts.

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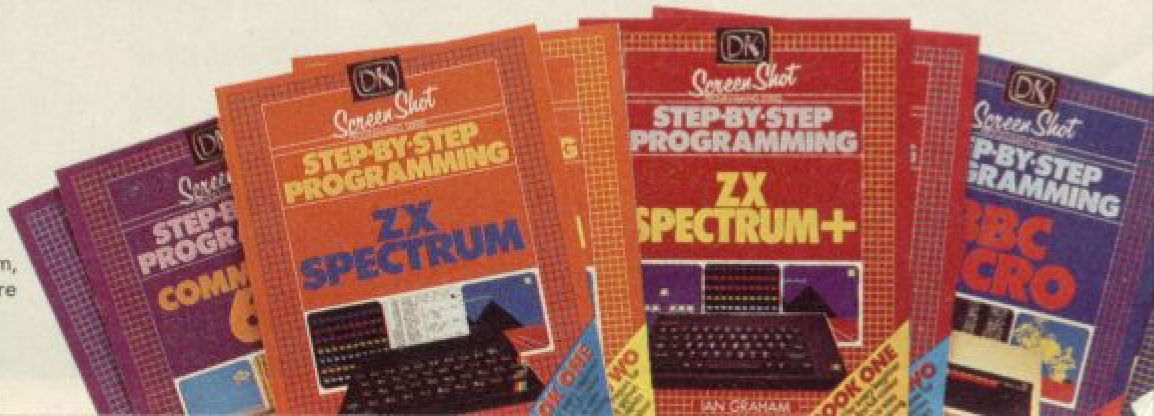
In the words of a reviewer in 'Big K' magazine, Screen Shots are "...clearly and expertly written with the best layout I have seen in a book of this sort...what you see is (for once) what you get. Outstandingly good and for beginners or semi-beginners: highly recommended."

The message is clear. If you really want to get into programming, get a Screen Shot.

With anything else, you won't be fully in the picture.

Screen Shot
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Screen Shot books available from larger branches of BOOTS, MENZIES, WH SMITH and other leading bookshops and computer stores. In case of difficulty, write to: Dorling Kindersley, 1-2 Henrietta Street, London WC2E 8PS.

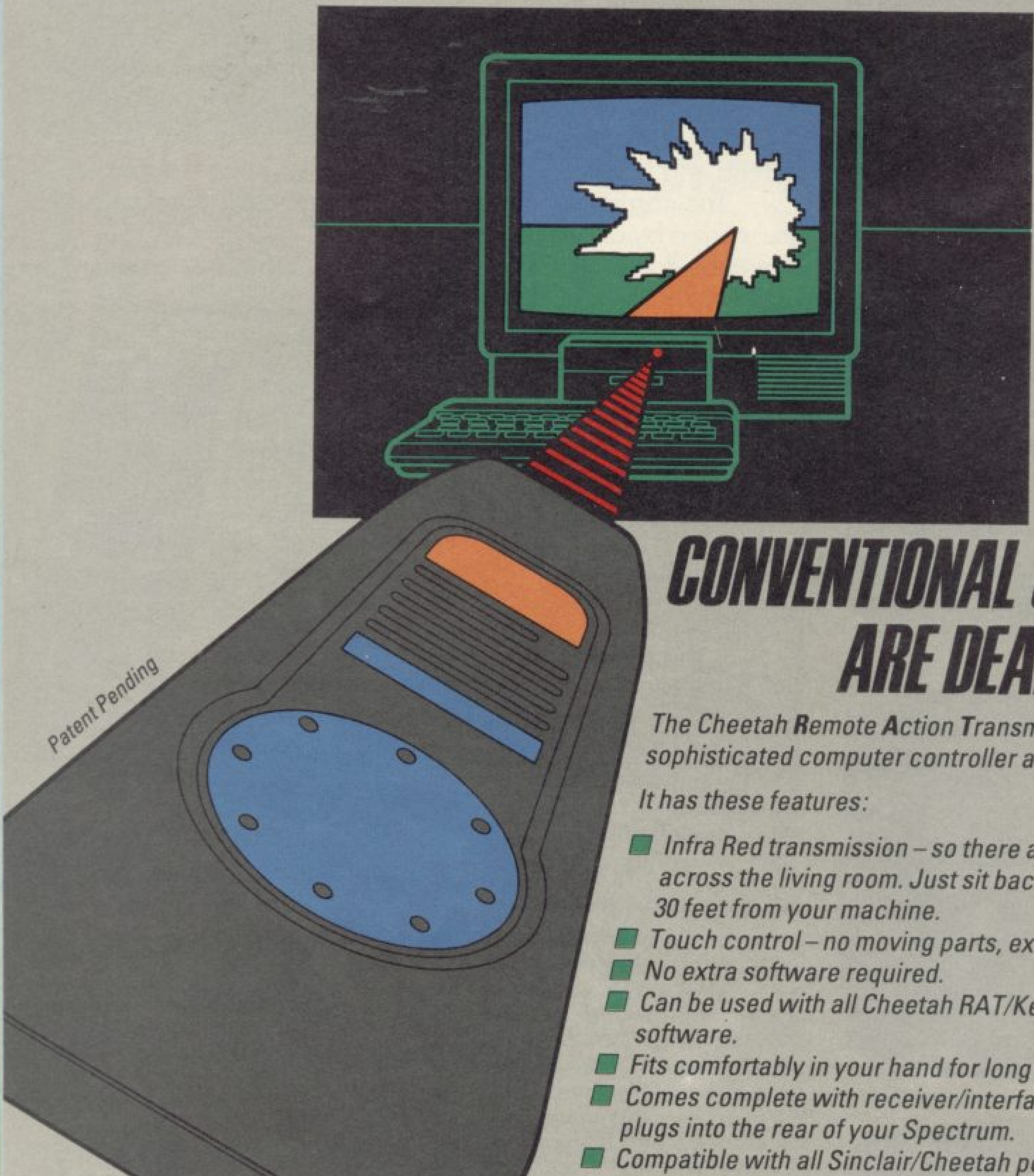



DK

Screen Shot Books 1 and 2 available for Sinclair ZX Spectrum, Sinclair ZX Spectrum+, Acorn Electron, BBC Micro, Commodore 64, Apple IIe. Books 3 and 4 available from April 1985.

Dorling Kindersley Publishers Limited.

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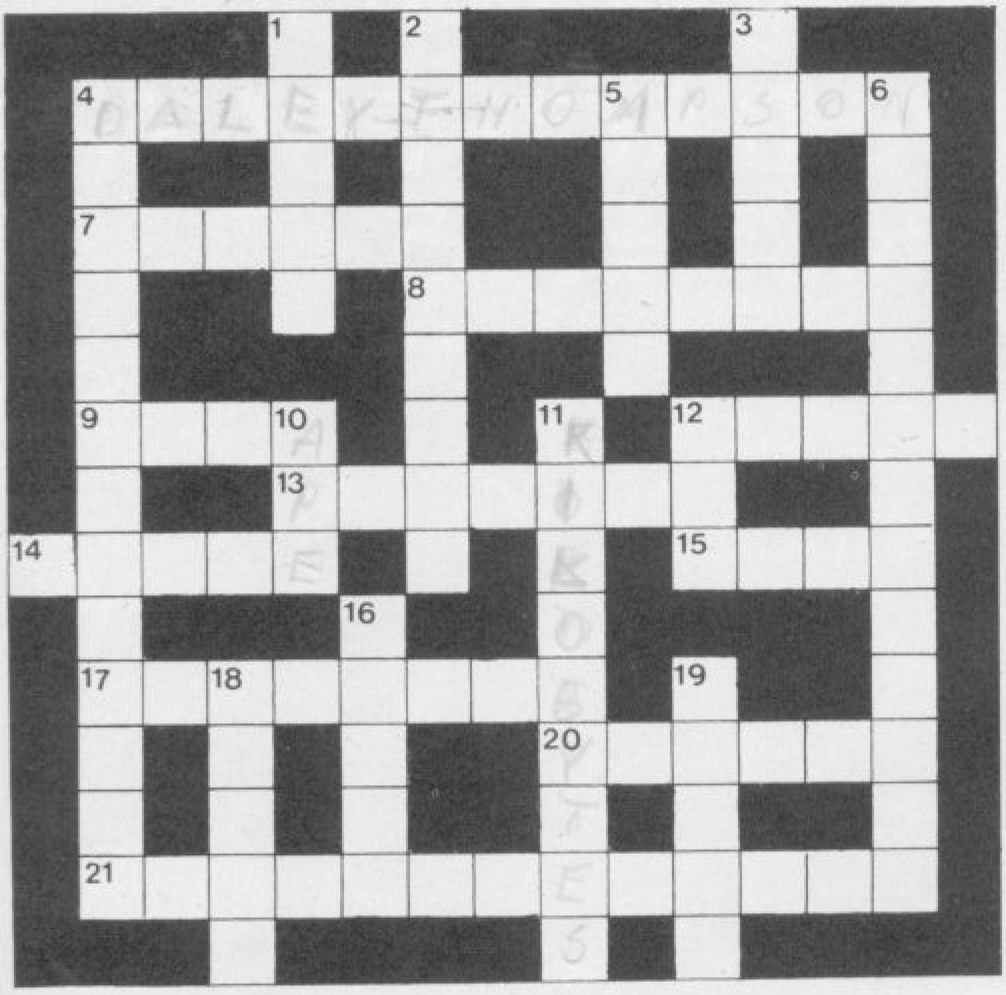
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John Menzies Boots WHSMITH Rumbelows

*and all good computer shops.*

Cheetah Marketing

# ZXWORD by Henry Howarth




**Across**

4. The Decathlon's his game (5,8)
7. RAM location kicked when dead (6)
8. Expounder of mathematical index (8)
9. Gigantic start to a very large number (4)
12. Basically a dim structure (5)
13. Cards or tape — boxed (7)
14. Argument of trigonometric functions (5)
15. Blemishes in a matrix on the printer (4)
17. TAN/COS Control Unit corrupted in business applications (8)
20. Man out to get the quantity (6)
21. Part-time band leader from Silicon Valley? (11)

**Down**

1. Accesses memory in high places, we hear (5)
2. Program instruction sent by the bank (9)
3. Monthly instalment of tissues? (5)
4. Moth-balls, perhaps, in the utility kit (9,4)
5. Status of Bishop and Knight (5)
6. Junction initially not producing new sort of radio (1-1-1 10)
10. Mimic character in Krazy Kong (3)
11. Numbers of Ks (9)
12. Sounds like some arithmetic (3)
16. It may be played with a MIDI interface (5)
18. Punctuation found by graduate on microfiche (5)
19. Cambridge computer company a leading light in adventure games? (5)

*Solution on page 142*

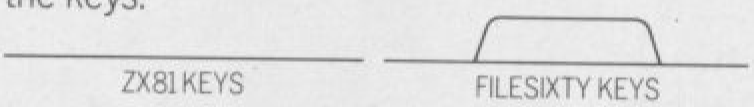
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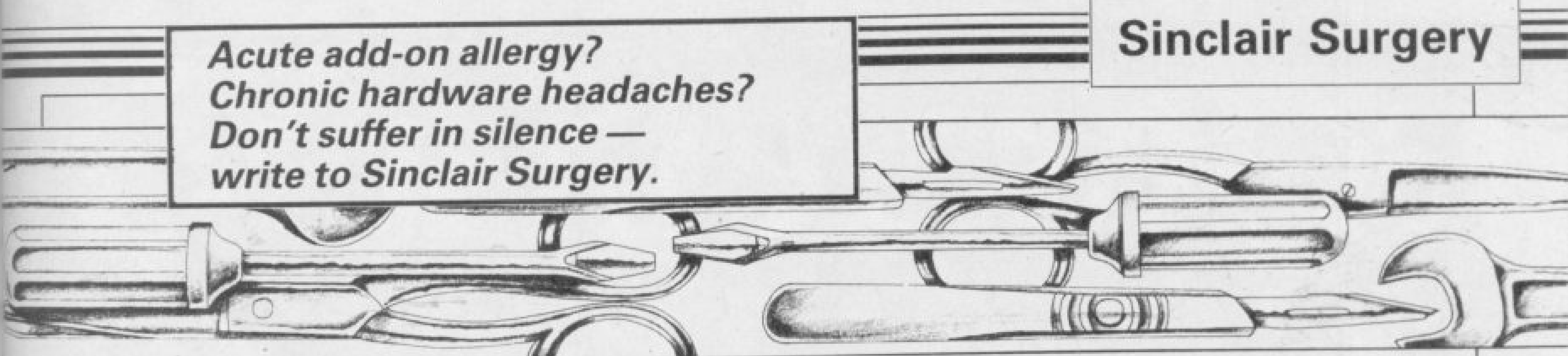
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***Acute add-on allergy? Chronic hardware headaches? Don't suffer in silence — write to Sinclair Surgery.***

## Hearing aids the volume

READERS may be interested to hear of a way of amplifying the sound from a Spectrum inexpensively.

Connect a television earplug, or 'Walkman' earphones, to the EAR socket of the computer, and this will amplify the sound when you wear the appliance. Although you cannot alter the volume — and earphones are louder than an earplug — it is far cheaper than any peripheral device for amplifying.

I am sure that this idea is not new, but I have never seen it in print before.

**David Gilchrist,**
**Basingstoke.**

## Updated is outdated

I SENT my 16K ZX Spectrum away for an update and when it returned B,N,M, and Symbol Shift were no longer functioning properly.

**Michael Doherty,**
**Uxbridge, Middlesex**

● *It seems that the company which carried out the upgrade has damaged the ribbon cable. If you do not trust them to fix it try TV Services of Cambridge, Chesterton Mill, French's Road, Cambridge CB4 3NP. Tel 0223 311371. They can supply a new one at a reasonable price.*

## ROMs around the world

YOUR REPLY to Daniel Morgan — Sinclair Surgery, December 1984 — regarding the Universal Modem Adaptor for the ZX-81 has brought us numerous enquiries regarding this adaptor. We have replied individually to those who enclosed a stamp but for the benefit of your other readers may we explain that although Comprocsys Ltd developed the copyright ROM for the UMA we did not produce the adaptor itself and ceased supplying our copyright ROM to the hardware manufacturer in May 1984.

However we do continue to produce and supply direct to customers worldwide our own ZX Aszmic ROM and Aszmic External Card for the ZX-80/ZX-81 and our SP ROM.

I hope this may clear up any misunderstanding.

**Donald F Johnson,**
**Comprocsys Ltd,**
**29 Campden Road,**
**South Croydon,**
**Surrey CR2 7ER.**

## Brother runs as printer

WILL the Spectrum, through an appropriate RS232 interface drive a Brother EP22 electronic typewriter printer?

**Richard Wall,**
**Pirbright, Surrey.**

IN the July 1984 issue of *Sinclair User* it was stated that the Brother EP44 was not suitable as a computer printer.

I see that the Argos chain is offering the Brother EP22 dot matrix print typewriter at £145.00. It is described as follows: "Built-in interface for use as printer for microcomputers with these specifications: RS232C, 75 or 300 Baud, 8 bit no parity, DTR Hand Shake."

I have a Spectrum 48K with Interface One and microdrive. Could you please tell me if this printer would be suitable for use with this micro?

**R A Russell,**
**Orpington, Kent.**

● *We have received a number of enquiries regarding the Brother EP22 and EP44. Both can be used with the Spectrum although the EP44 in particular is rather slow. If you have an Interface One then use the standard Sinclair cable to connect the two together. To print something consult Chapter 8 of the microdrive manual. For listings enter:*

*OPEN #3;"t":LLIST*

*or for simple printing:*

*OPEN #3;"t":LPRINT "This should work".*

## Monitoring a connection

IS there any way of connecting a monitor to an Issue One Spectrum?

**Peter Copping,**
**Manchester.**

● *If you want to use only a composite monitor then it is easy. On Issue One and Two the video signal is not taken through to the edge connector. All you must do is find the word VID printed in white on the circuit board above two solder points. If you join those, the circuit is complete.*

*To use an RGB monitor you will need an adaptor. The only company which makes a separate one for the Spectrum is Adapt Electronics, 20 Starling Close, Buckhurst Hill, Essex IG9 5TN. Microvitec PLC, Futures Way, Bolling Road, Bradford BD4 7TU, sell a monitor which includes an adaptor. To use either you will need to make connections inside the Spectrum and they can advise you.*

## Receiving the Oracle

IS there any hardware which will enable my Spectrum to receive Ceefax and Oracle?

Also, is it possible to put the computer in and out of graphics mode during a program?

Finally, can I connect a DK'tronics 56-way ribbon connector to a Currah μslot?

**Jan Heath,**
**Bristol, Avon**

● *To answer your points in turn: 1 — the TTX 2000 from OEL, North Point, Gilwilly Industrial Estate, Penrith, Cumbria CA11 9BN, priced £143.75; 2 — use POKE 23617,2 for graphics mode; POKE 23617,1 for extended mode; POKE 23617,0 for the normal L cursor (that is best seen if you follow the POKE by an INPUT statement); 3 — yes.*

## Colourless keyboards

I RECENTLY acquired a Spectrum and I am not happy with the keyboard. Not just because of its sloppiness, but because I am colour deficient, which means that the colours red and green present a problem. I wonder if you could suggest an alternative keyboard.

**G F Jones**
**London SW3.**

● *There are as far as we know, no keyboards that use different contrasting colours. The best we can suggest is that you have a look at the 68FX1 from Fox Electronics which uses only red and black or the Fuller Executive which only uses white — as does the Spectrum Plus.*

# software that's hard to beat...

**48K SPECTRUM**

## TASWORD TWO

### The Word Processor ✱

*"If you have been looking for a word processor, then look no further."*
CRASH June 1984

*"The number of on-screen prompts, together with the excellent manual, make it ideal – even for an absolute beginner."*
PERSONAL COMPUTER WORLD September 1983

*"Without doubt, the best utility I have reviewed for the Spectrum."*
HOME COMPUTING WEEKLY April 1984

Your Spectrum becomes a professional standard word processor with TASWORD TWO. Sixty-four characters per line on the screen is just one of the many features of this versatile program. The cassette also contains TASWORD TWO TUTOR. This teaches you word processing using TASWORD TWO. Whether you have serious applications or simply want to learn about word processing, TASWORD TWO and TASWORD TWO TUTOR make it easy and enjoyable. TASWORD TWO is readily adapted for the microdrives to give super-fast saving and loading of both program and text.

**PRICE £13.90**

## TASCOPY

### The Screen Copier

Screen copy software for ZX Interface 1. Print high resolution screen copies (in a choice of two sizes), and also large "shaded" copies with different dot densities for the various screen colours. Tascopy supports all eight pin dot matrix printers with Epson type control codes. e.g. Epson RX-80 and FX-80, Shinwa CP-80, Mannesmann Tally MT-80, Star DMP 510/515, Brother HR5.

**PRICE £9.90**

## TASMERGE

### The Mail Merger

Transfer data from MASTERFILE to TASWORD TWO! Letters and forms typed on TASWORD can be printed with addresses and data taken from MASTERFILE. The mail merge facility allows, for example, multiple copies of a letter to be printed, each containing a different name and address taken from your MASTERFILE data. To use TASMERGE you must have one or more microdrives as well as TASWORD and MASTERFILE by Campbell Systems. (version 9 or later).

**PRICE £10.90**

## TASPRINT

### The Style Writer

A must for dot-matrix printer owners! Print your program output and listings in a choice of five impressive print styles. TASPRINT utilises the graphics capabilities of dot-matrix printers to form, with a double pass of the printhead, output in a range of five fonts varying from the futuristic DATA-RUN to the hand-writing style of PALACE SCRIPT. TASPRINT drives all dot-matrix printers with bit image graphics capabilities and can be used to print TASWORD TWO text files. TASPRINT gives your output originality and style!

**PRICE £9.90**

## TASWIDE

### The Screen Stretcher

With this machine code utility you can write your own Basic programs that will, with normal PRINT statements, print onto the screen in the compact lettering used by TASWORD TWO. With TASWIDE you can double the information shown on the screen!

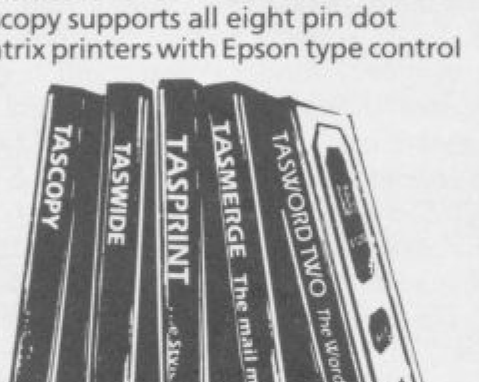
**PRICE £5.50**

## TASMAN PRINTER INTERFACE

Plug into your Spectrum and drive any printer fitted with the Centronics standard parallel interface. Supplied complete with ribbon cable and driving software. The user changeable interface software makes it easy to send control codes to your printer using the method so successfully pioneered with TASWORD TWO. The cassette also contains fast machine code high resolution full width SCREEN COPY SOFTWARE for Epson, Mannesmann Tally, Seikosha, Shinwa, Star, and Tandy Colour Graphic (in colour!) printers. Compatible with microdrives and ZX Interface 1.

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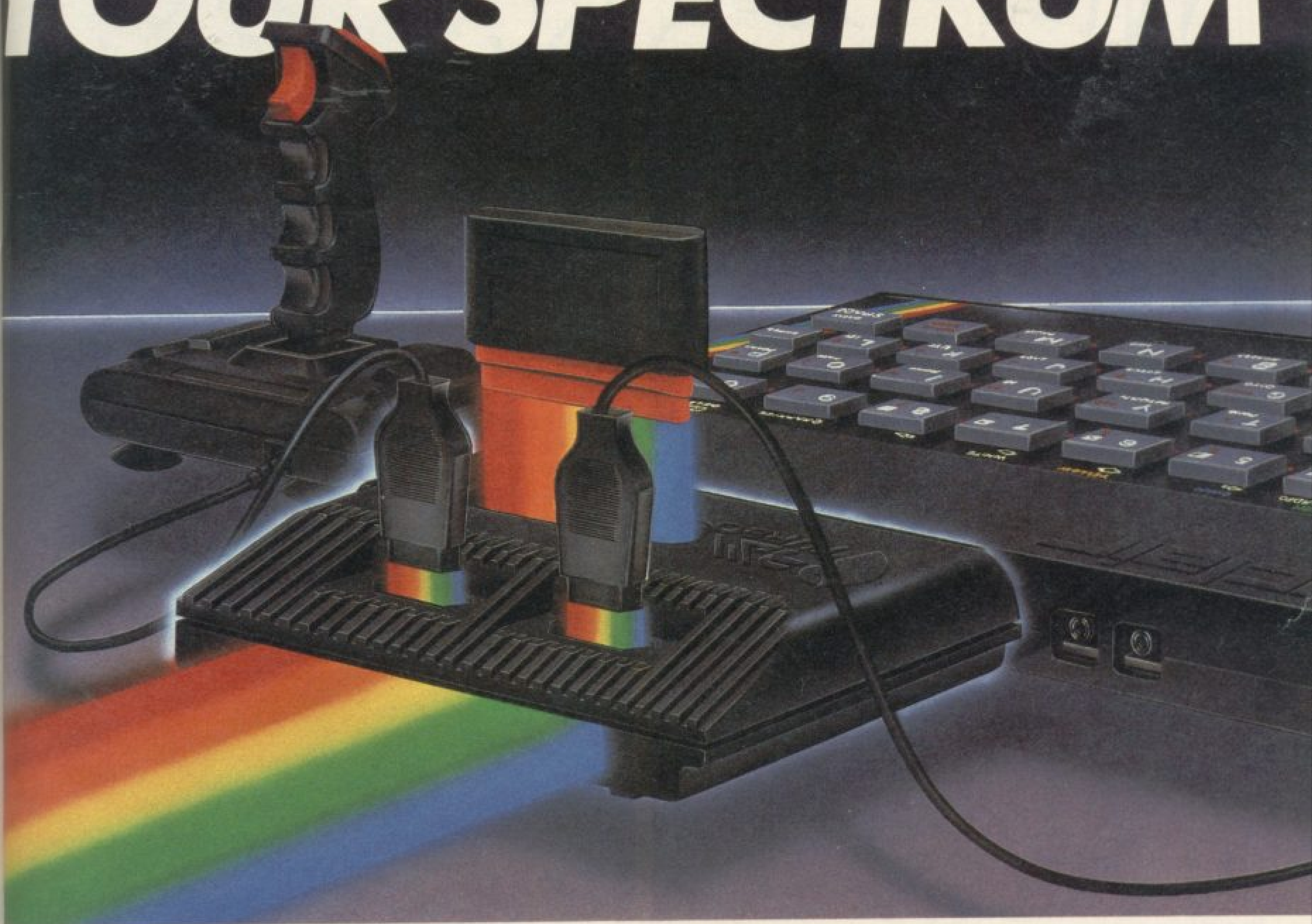
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# Wizz for Skooldaze!

## Chirs Bourne unwisely allows a grate frend to investigate Microsphere.

WHEN YOU write a computer game it always go wrong becos of THE BUGS as any fule kno. Peason who is my grate frend wrote an uterly wet game in prep. but Mr Reidy make up games for MICROSPHERE and his are all grate fun with v. good graffics.

I desided to write about Mr Reidy for a projekt and espechally about **SKOOLDAZE.** It is a wizz game about skool you hav to hit the skool shields with gats and also the masters it is fantastic. In the game the headmaster has a BAD REPORT in his study and you must get it back. Evidently Mr Reidy hav not heard of the Molesworth Bogus Report system for good marks.

Here is the projekt.

### Mr Reidy

Mr Reidy live in a house his name is David but he is 32 yrs. He hav a wife called Helen. She is a teacher chiz chiz but she only teach tiny boys and gurls. Mr Reidy write the programs and Mrs Reidy she does the adverts and things in the offis.

Before he write games strange to relate Mr Reidy work with big computers price £1000000002 they are called MAINFRAMES. He sa, "I was a production systems manager working with on-line dataframe — all the buzzword stuff."

All profeshunal programers talk like this e.g. on-line dataframe which mean everybode on the same machine at once don't pull the ribbon cable peason CRASH and yet again the skool BBC xplodes and no more math. today cheers cheers.

Mr Reidy did not go to skool like us mere mortals but to UNIVERSITY insted. He learn about NEUROPHYSIOLOGY and ZOOLOGY. "Now you are going to ask me why someone like me is writing computer programs. In fact nerves are all about communication. From a practical viewpoint knowing the mathematics of information theory did help with computers, and I have an active interest in certain aspects of artificial intelligence, mainly graphical. I am not talking about the Spectrum but big mainframes, the sort of stuff where you give it nine points and it draws a landscape."

That is quite enuff about that.

### How to start a company

Mr Reidy start his own company at the end of 1982. He write for the ZX-81 but it is all weedy bizness programs. For the Spektrum he write OMNICALC it is a spredsheet. Grabber hav it, it add up numbers and does all his homework. Grabber is head boy and a big buly.

"I was marketing software under the Microsphere name but also doing a lot of contract work. Optimax, a linear programming thing was sold by Hilderbay," sa Mr Reidy.

"Then we were begining to get games out. There was the **Train Game** and **Wheelie.** Wheelie broke very slowly, but it has been selling steadily now for over twelve months, which is remarkable."

Microsphere is a small company but Mr Reidy work with another man, Mr Warrington, his name is Keith. He does the GRAFFICS for the games becos he is an artist. All artists are suposed to be weedy unless they are French and kno about life and gurls hem-hem. But Mr Warrington is not bad, to judge from **Skooldaze.**

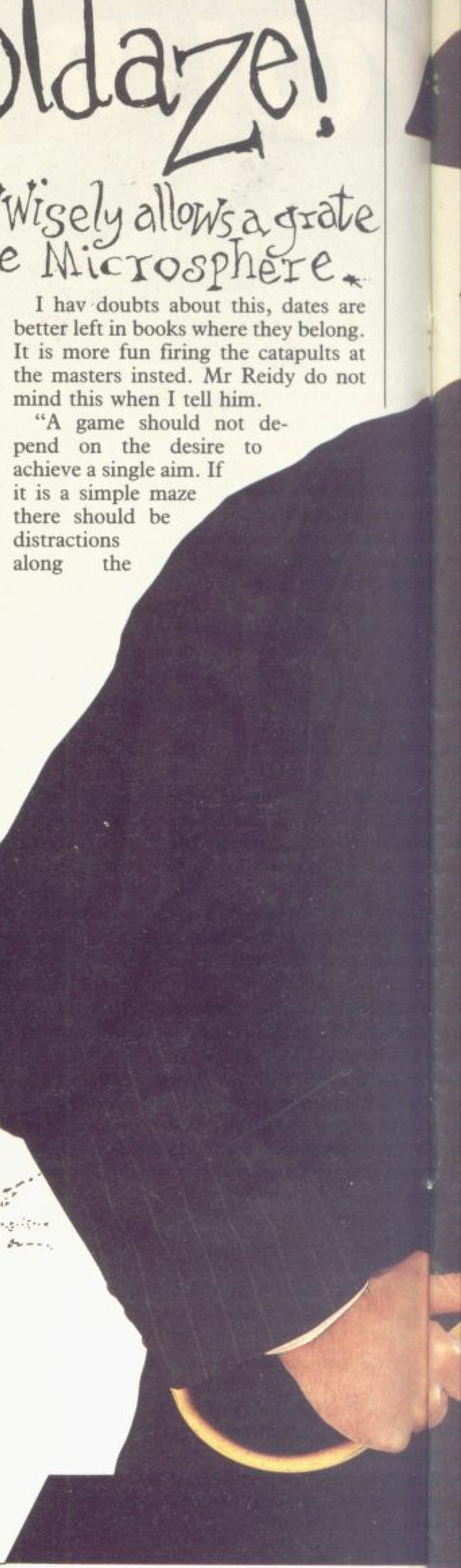
### Skooldaze

"The only reason for doing **Skooldaze** was I wanted to see lists of all the dates of battles in English History appearing in the hint pages of magazines," sa Mr Reidy.

He sa this because in the game you must find when Mr Creak was born to open the safe with the dreaded report in it. He is the History teacher and v. old and he gives clues to do with battles.

I hav doubts about this, dates are better left in books where they belong. It is more fun firing the catapults at the masters insted. Mr Reidy do not mind this when I tell him.

"A game should not depend on the desire to achieve a single aim. If it is a simple maze there should be distractions along the





way. In **Skooldaze** you don't have to know what to do to enjoy it."

Mrs Reidy sa a boy rang up to ask how to write on the blackbords, which any fule kno. "I told him how to do it and then I went into the teacher bit and told him he shouldn't be writing on blackboards anyway."

Everybode in the game are just like in my skool. "It was designed for school stereotypes," sa Mr Reidy. "Every school has a swot, and a bully. Every school has one angelic looking little boy who is a real terror — Boy Wander in the game. And there is always someone who you wish you were as nasty as, but always gets away with it."

"Then there are the masters. The science master is always a mad boffin. Every school has one trendy master — Mr Withit the Geography master. You can put your own names in, which is very important. It makes the game more social, like a family occasion."

Aktualy you do not want to involve your family in **Skooldaze** it is sordid enuff as it is without pater getting cross about your high score and becos sombode has drunk all his best gin hem-hem.

## How to be Topp at Games

"It takes four or five months to get an idea together for a game," sa Mr Reidy. "You say, 'I'm going to write a game about a school' and then several months later you can get on with it. You have to structure it properly to being with."

Mr Reidy hav a grate brane e.g. he can write MACHINE CODE straight down on paper, he does not even use an assembler sometimes.

LORD MOLESWORTH OF FLETE ST.: "How do you do the graffics etc.?"

MR REIDY (*amazed by sagacity of question*): "I need a strong visual sense right at the beginning even if it does not coincide with that of the graphics artist. Keith Warrington will discuss it with me and do some roughs, so I know what sort of animation is required."

Mr Warrington kno all about colours and how they look next to each other, and also about what you do not see in the picture, i.e. if you look at a picture you do not notice everything there, and Mr Warrington kno xactly what you are not looking at. Mr Reidy think this is v. important.

Some companies write wizz games about killing things with germ guns and the PUKON but Microsphere do not write those games. Mrs Reidy sa "I'm not thrilled by violent games. We don't kill persons. Our games are usually to try and save yourself from something or other."

## The state of the NATION

All programers like to sa wot they think about the SOFTWEAR INDUSTRY. It is becos they want to be reassured about working in it. Grabber sa the softwear industry is in trouble becos his dad has 700000 shops selling games and canot afford to give him more pocket money but Mr Reidy sa it is not true.

"We are not feeling a squeeze at all at the moment but it does seem to have got into a seasonal market. That creates cash-flow problems and nobody likes it. In general there will probably be a shakeout this year."

What he means is when you shake a bottle of ginger beer it xplodes because the mollicules get excited. So we can ekspect to hear a lot of banging all over England in 1985.

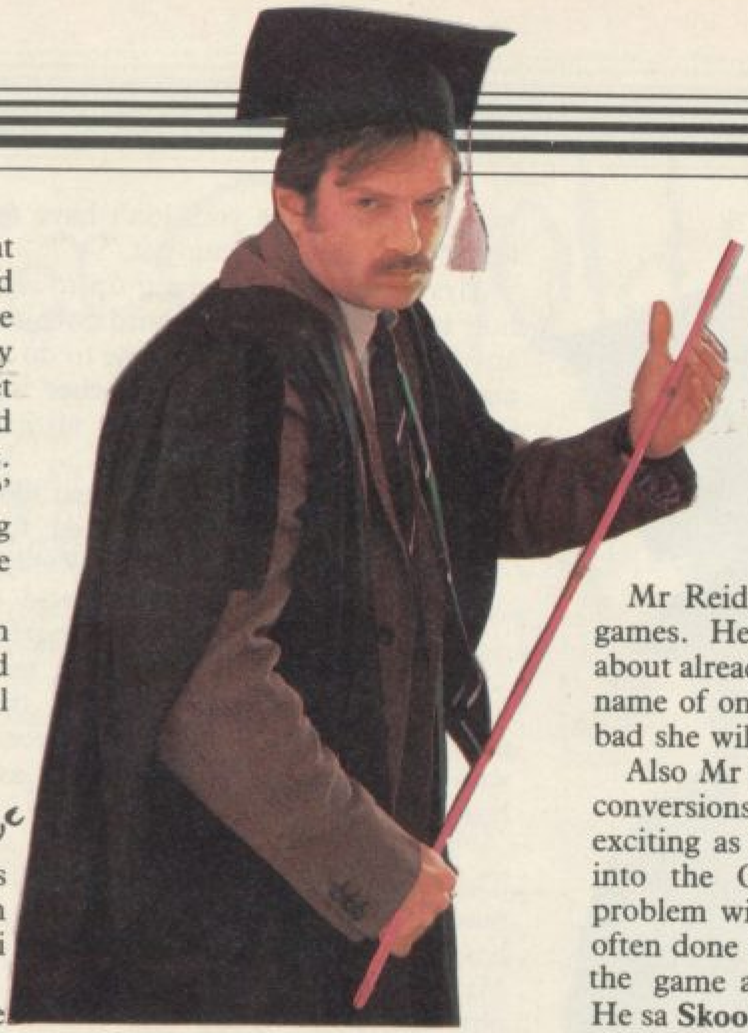
"It was all little people at first," sa Mrs Reidy. "And now the big ones seem to be moving in." Mr Reidy agrees. "Quicksilva and Ocean were small once" sa he. "But the bigger things get, the more hype there is and there are less authentic original games. For us it is very healthy because we have a very successful game. If we were setting up at this stage I wouldn't bother.

*continued on page 52*

*continued from page 51*

"The usual silly things happened at Christmas. We had to push quite hard to get into Smiths and Boots. They are not dependent on your game, and they also sell to a slightly different market to specialist shops. A lot of it is caused by hyping products to the eyeballs. They ask 'What backup do you have?' and if you have a massive advertising campaign they say 'OK, we'll take it'".

Well that is life and no more than you ekspect. If you think it is all a bed of roses just ask Mr Grabber he will tell yu a different story hem-hem.



## All Work and No Play etc

All programers do wierd things when they are not programing which they do nearly all the time as far as i can see.

Mr Reidy runs up and down all the rodes in N. London v. slowly, it is called jogging and worse even than GYM which make the body beatiful as if anyone could, look at peason his is beyond redemption.

He also pla the guitar, he pla the blues and Mrs Reidy pla classical tunes. He like to pla games but only those which exercise his grate brane e.g. Chess and Go and intelektual card games.

He read science fiction books. "I love the cheap stuff, like E E Doc Smith, but also Vonnegut and Van Vogt. I like *Dune* but I've heard the film's terrible."

Mrs Reidy sa he is a bit of an old hippy but he sa it is not true.



## A Look into the Future

Mr Reidy sa he will go on writing games. He hav two he is thinking about already. Mrs Reidy made up the name of one she sa it is a pun and so bad she will not tell me chiz chiz.

Also Mr Reidy is going to do some conversions, it is like in Div. not as exciting as you think. "I want to get into the Commodore market. The problem with conversions is they are often done by people who do not like the game and do not understand it." He sa **Skooldaze** may be one so all the oiks with Commode 64s will hav it.

## THE END

That is my projekt about Mr Reidy and Microsphere. Peason help with the title graffics, that is why they are all wet and weedy and uterly pathetic.

# Papert's prophecy

SEYMOUR Papert, the father of the Logo language, has arguably done more for computers in education with his book *Mind Storms* than anyone else.

His ideas about the lifting of restrictions and enjoyment of learning within the classroom form the basis of the book which describes the conception and use of MIT Logo within educational environments around the world.

The basic premis, which he supports vehemently, is that children learn more by discovery rather than by rote. Give a child the choice between a multiplication table and a computer running **Logo** and the child is more likely to take the latter. Papert also asserts that the child will learn more and in *Mind Storms* he makes a good job of proving it.

Papert's arguments make sense not least because he is more literate than many of his colleagues in education. As he explains his proposals he sets up questions between the lines which critical readers are likely to ask and then with great modesty knocks those critics down with practical solutions to the problems.

In the introduction critics are at first likely to attack him for his apparent lack of concern for the teacher/pupil ratio. Many will say that his ideas seem to point to an educational system where the lack of resources and trained staff can be corrected through the use of computers.

Papert sets up the critics and then says: "My goal is not educational economies: It is not to use computation to shave a year off the time a child spends in an otherwise unchanged school or to push an extra child into an elementary school classroom . . . I believe that certain uses of very powerful computational technology and computational ideas can provide children with new possibilities of learning, thinking and growing emotionally as well as cognitively."

Papert is obviously a utopian but this book shows that he is willing to adapt, just as his language is adaptable. His book is a worthwhile read for everyone who is disenchanted with the computer scene.

*John Gilbert*

**Mind Storms**
Publisher: **Harvester Press**
Price: **£4.95** (paperback)

# Simple QL games master

AS PREDICTED, the flow of QL games listings books has started and, ever to the fore, Granada, now Collins, Publishing and its seemingly resident authors Kay Ewbank, Mike James and S M Gee have released *QL Gamesmaster*.

The book is not to be confused with other titles in the Gamesmaster series. *QL Gamesmaster* has been written from scratch and provides some original and entertaining listings to enter for those who have nothing better to do with their time or £400 worth of Quantum Leap.

Ewbank and Co have tried to disguise the nature of the book by including an introduction which, in general, repeats the advice of author Roy Atherton in the Beginner's Guide which is packaged with the machine. Once they have got over that hurdle they sprint into a series of "simple but effective" program listings.

Admittedly, the programs are simple but the explanations do reveal new information about games design on the QL. That is not surprising as almost nothing has been written about the QL and its game-playing abilities. Programs include **Ant Hill, Leap Frog, Frogling** and **Tadpole**. You can probably take an intelligent guess as to what they look like and how they all play.

If you are interested in demeaning the abilities of your expensive new computer then buy **QL Gamesmaster**.

*John Gilbert*

**QL Gamesmaster**
Publisher: **Collins**
Price: **£7.95** (paperback)




# Putting theory into practice

THE immediate impression upon opening *Software Projects for the Spectrum* is "oh no, not another book about structured programming".

You may feel by now you have grasped everything that there is to know about the subject, but few books ever show how to put that knowledge to good use. Software Projects is, thankfully, different.

Despite the usual introduction where the author, Rudolf Smit, tries to show what an artist he is with words — describing software writing in terms of analogies and similies — the book gets off to a promising start with a blow-by-blow account of the projects to be attempted within the following chapters.

The programs include a birthday and anniversary calender, a word guessing game and three-die roller. A motley crew, and not the most inspiring of topics, but we must not grumble as the book is, after all, for the beginner who has just received a Spectrum.

Each chapter contains a series of sections illustrating the program which is to be built and reproducing the subroutines which make up its main structure. The author is not content to give only lists of programs.

For instance, in the chapter on calenders Smit talks about the construction of dummy statements in the computer which are then replaced with real program code when the programmer knows how the code should be written.

Although Software Projects succeeds in its aim of introducing new users to the practice, rather than the theory, of programming techniques it has to be asked whether the book provides too much help. The author may not give the full listings of projects but the descriptions of the programs leave little to the imagination.

*John Gilbert*

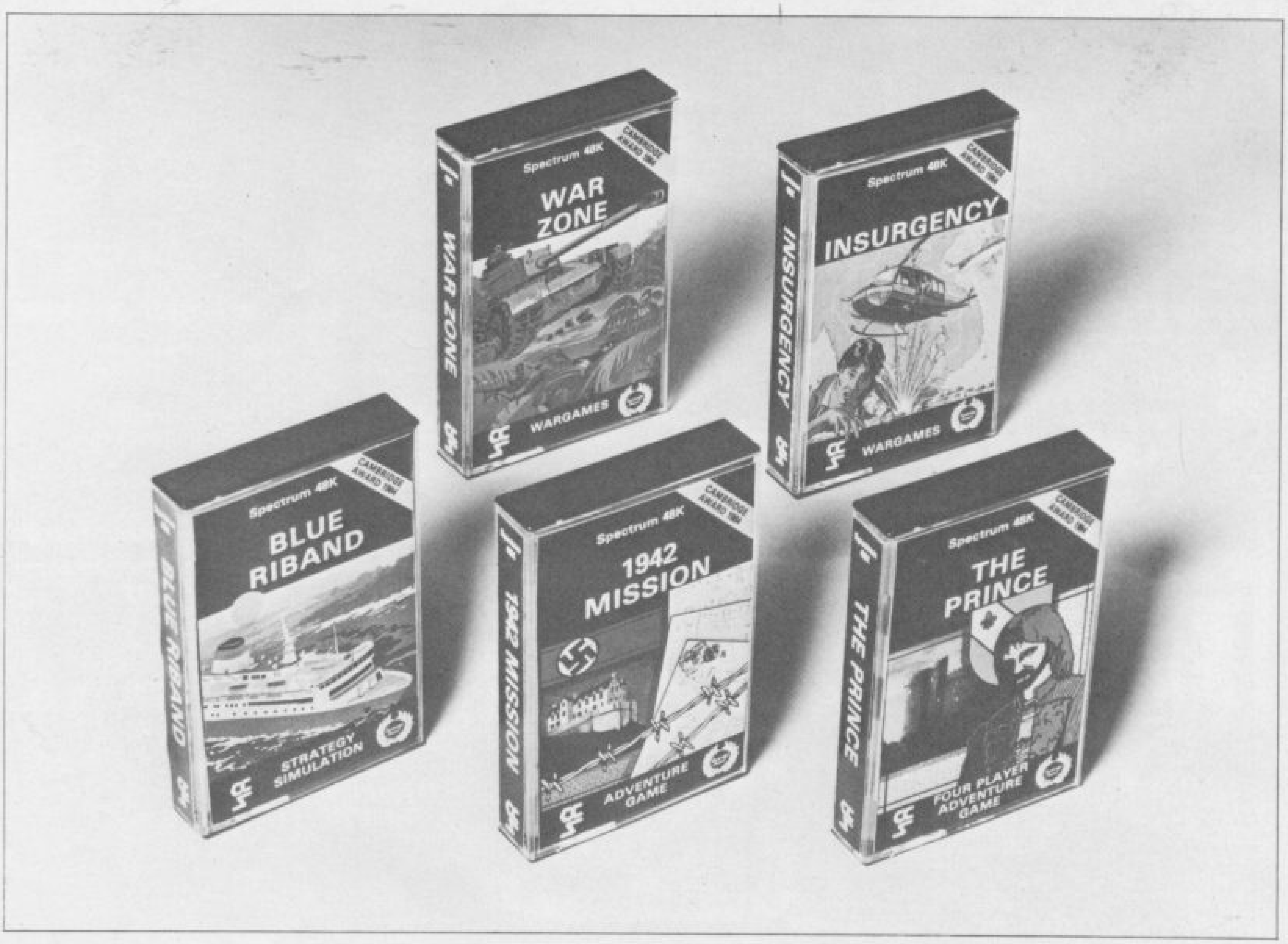
**Software Projects for the Spectrum**
Publisher: **Melbourne House**
Price: **£6.95**



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# Lending an extra dimension to chess

## Theo Wood reveals the secrets of Ann Hughes' QL graphics



QL CHESS was one of the games software high points of 1984, a year which included the state-of-the-art **Match Point.** Both games were produced by Psion. Both games featured graphics designed by Ann Hughes.

The company began in Huntsworth Mews, London — a small informal office packed to the gills with desks and people. The new base in Dorset Square is in direct contrast, an elegant Georgian house swamped with pile carpet.

Ann Hughes works here — one of a team of three graphic designers who have joined Psion over the past year. Ann is typical of many graphic designers; trained to use methods involving paper technology she is discovering that a knowledge of computer graphics is an almost indispensible skill in the commercial world.

Just before starting at Psion in October 1983 she had been working as a freelance stage designer, wielding massive brushes which could scarcely have been further from the pixel resolution required in a microworld.

She had no experience of using computers: "I didn't know one end of a computer from another; I thought a pixel was a pistol." Her first work for Psion, designing the QL manuals and working on cassette packaging was little different from her previous training. The only problem was a lack of specialist graphic equipment to reproduce diagrams and charts. That was soon remedied.



**Match Point** was her first challenge in designing for the screen. "The game came to me with the dimensions of the court laid out so there wasn't very much to do in designing the game itself. Most of the work went into the design of the characters."

Ann found the limitations of screen design very frustrating in that the Spectrum screen attributes allow only two colours. When animation was introduced the problem became worse, and there was also the memory limitation to be considered. Tackling even a minor problem, like the movement of the heads in the crowd, had to be subject to an ingenious solution, "I did just two screens and narrowed the heads to make it look as if you were seeing their profiles, and then flicked them. There wasn't much else to do within the memory."

The animation of players and ball boys was done first on graph paper, colouring in the individual pixels, with eight positions for the ball boys and ten for the players. Steve Kelly — driving force behind the classic **Chequered Flag** — then wrote an animation program on a Vax computer which would remember the individual characters, send them down to the Spectrum and then run them in a sequence.

Initial results were not spectacular. "It was really funny though, as I'd not done animation before, and at first when the characters ran, they were doing some dreadful things . . . Some had peglegs," Ann laughs.

The title screen had its own particular difficulties. "This took the most blood, sweat and tears, and is what I would count as the most graphic thing. The skin tones were very difficult — I used a photograph and tried pixellating it to scale. I started with one version and then modified it. One aspect that really killed me was when he was holding the racket and I wanted the handle part to be a different colour. Then there was his hand and the background, so that was three different colours in one attribute. So I had to put it on the edge of an attribute and that meant that his arm might be too long. I had to really play around with those features."

Ann went on to design the title screens for the educational games **Estimator Racer** and **Number Painter.**

Then it was **Chess** for the QL. There was no software available at the



Photograph: Andrew Sydenham

time, and to remedy that Steve Kelly wrote a graphics program providing the facilities that Ann required. Nick-named QDraw, the program is on microdrive and has a number of useful functions — enlarge/reduce, alter pen size, and patterning are just some. Designs can be SAVEd on microdrive.

QDraw is obviously a powerful graphics package but QL users will have to live in hope, as what can be used as an in-house design program still requires a great deal of work before it can be introduced to the market. Psion has no immediate plans to do that.

Ann found it was with this program that pencil and paper became redundant. "When I started I was so used to paper and pencil that I couldn't relate to the screen at all," she explains. "I did everything on graph paper, but when you draw on paper you don't get the same effect, as the light out of the screen tends to flatten everything. Now that I'm used to it I do most of my designing straight onto the screen."

One of the most useful facilities QDraw gave Ann as a designer was the ability to replicate pieces behind and on top of other pieces as well as to move them. That gave her the power to see how each piece would look behind or in front of another in various stages of play.

The problems of white pieces on white are obvious and the same goes for black on black, but Ann found that the white/green and black/red combinations also suffered from lack of definition. A black line round the white pieces, and white round black, was used to overcome the difficulty — something she would not have done in an ordinary drawing. That technique is only used when necessary and the lines disappear otherwise.

Colours were a source of frustration: "It is totally restricting, coming from something where you have everything at your fingertips and to be told that you have to work in squares and you can't mix colours." Ann 'mixed' colours for the base of the board where she tessellated black and red to gain a similar effect.

Problems cropped up. "I started off by doing the pawn and did it much bigger because I wanted the pieces to really fill the screen. But then there was an overlap so I had to redo all the pieces I had done until then, as I started trying out the relationships."

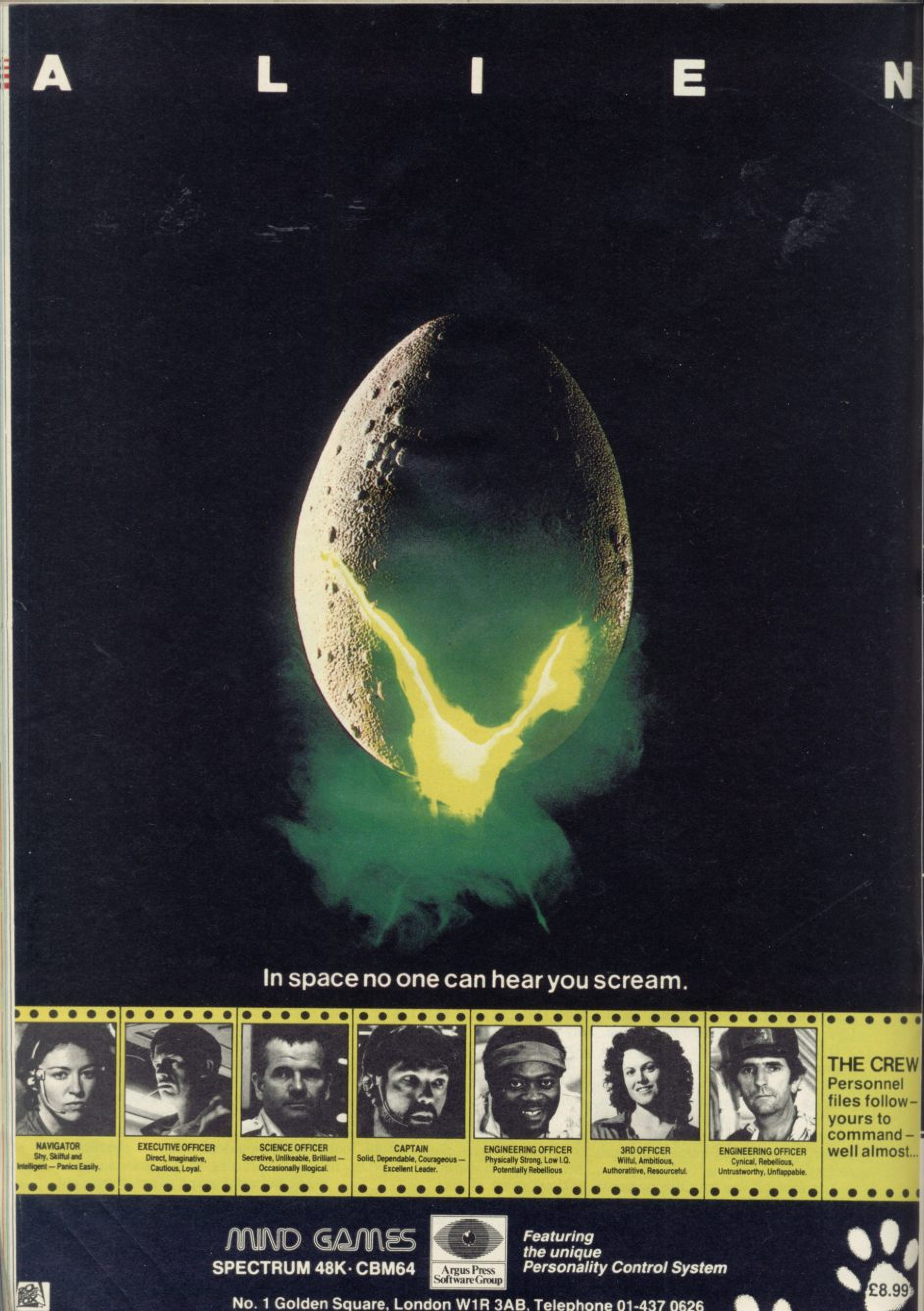
Ann also designed the display board on the flick screen which records the moves made. That, unlike the playing board, is in 2D. But it is the 3D effects which are the most stunning, although Ann is self-deprecating: "Let's be frank. This QL gives me so much more. I don't necessarily think it's an advance because of what I have done."

Ann feels that the way forward for computer graphics will be towards higher resolution at lower cost. That means more realistic animation will be possible, and it is that aspect of computer graphics which interests her most.

She also feels that there will be a radical change in cassette packaging based, in many cases, on the 'cosmic' art of the '60s. Psion has gone through this change, exemplified in its logo which is now more abstract.

Her current work is mainly translations of various programs to other machines, and **Chess** will be translated for machines such as the IBM and Mackintosh. Ann Hughes however is not someone to rest on past glories and although already highly qualified as a graphic designer she wishes to perfect her work; she is attending a computer graphics course which will involve using programming techniques.

For would-be designers she recommends starting with a drawing package and using graph paper to work out animation sequences. And, "Be patient, that's the main thing really."


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# Spectrum users get down to Basics

## Our new series for beginners starts with an overall look at hardware and software. Michael Spencer is your guide

YOU ARE NOW the owner of a valuable piece of hardware — a Sinclair Spectrum. Hardware is a computer word meaning the computer itself, whereas software means programs that run on the computer.

A Spectrum may be under the protection of a year's guarantee which is reassuring but is not the same as insurance. A sensible move is to insure it, make a note of the serial number — found on the underside — and mark your name and postcode on it using an invisible marking pen.

Humidity, direct sunlight and dust are all potential hazards as are the many leads necessary to the operation of the computer. The Spectrum can get quite warm, even hot, and it is essential that the ventilation holes are not blocked up — a firm flat surface is the best place for it, not on a cushion on your knees.

A less obvious source of trouble is the plugging and unplugging of leads and the various accessories which you can buy. Apart from the cassette lead, all other leads and peripherals should only be plugged in or removed when the computer is switched off; never use force as they are vulnerable to mechanical damage which is expensive to repair.

The most popular way of storing programs is on ordinary domestic cassette tape and a very large proportion of all programs are supplied in that way. The problem is that the ordinary domestic cassette recorder is not designed for this purpose; Sinclair Research has kept the cost of the Spectrum down by making use of it along with the other necessary item — the television set.

The computer can be particularly sensitive to the cassette recorder and the setting of volume and tone controls. Once the correct levels are found then there should be no trouble. The tone control usually works best at one end of the range or the other and will be easy to set. The volume control will have a minimum setting above which all other settings ought to be correct.

Loading a program is generally easier than saving one; the cassette recorder controls may require experimentation before the correct levels are found. As there is no way of checking that a program is being saved correctly at the time Sinclair has provided a means of checking that a good copy has been made afterwards. That process is known as verifying and if it fails the cassette recorder controls should be re-adjusted and a fresh copy taken.

Mono cassette recorders are the most suitable type of tape recorder to use; stereo cassette recorders can be troublesome because there are two recording channels and unless provision can be made for recording and playing back on one channel alone it is unlikely that such a recorder will be consistently successful.

A useful feature is a tape counter, which can save time when finding previously saved programs or the space to save another. When buying such a recorder it is prudent to state that it is being bought for use with the Spectrum. If it is then found to be unsuitable it may be easier to exchange for another model.

A reduction in recording quality after many successful recordings may be due to poor quality tape or dirty recording heads in the cassette recorder. Do not be tempted to buy an expensive computer or tape recorder cleaning kit but read the manufacturers' instruction book instead. In many cases cotton buds and a little alcohol from the local chemist is a cheaper alternative. Most computer users record on short cassette tapes such as C15 and not long ones like C120. Buying very cheap tapes is false economy; buying a pack of short tapes can be a worthwhile investment.

Televisions are as much a compromise as cassette recorders and often suffer from visual oddities. New users of home computers are very often disappointed at the picture quality and tend to blame the computer. If you are prepared to spend the money, about £300, then the most recent Spectrum models can drive some colour monitors with suitable connections. A colour monitor is not capable of picking up TV broadcasts so it is expensive for what it does, but you do get a good quality picture.

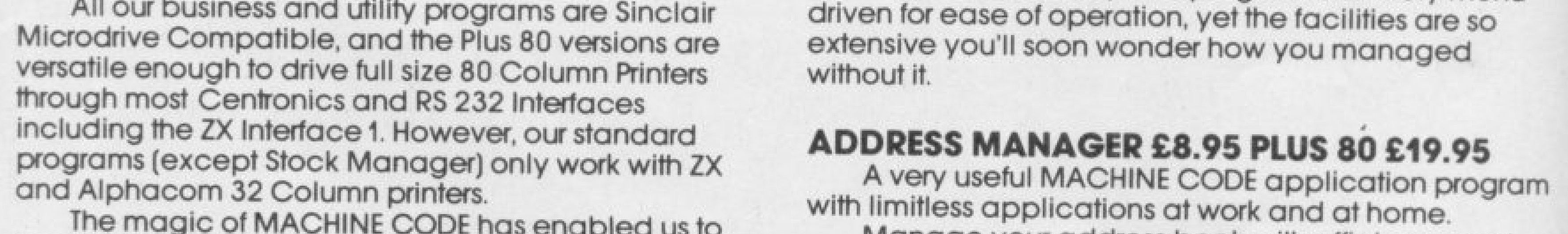
On an ordinary television set full use of tuning, brightness, colour and contrast can optimise the picture. There will be certain visual abberations which cannot be eliminated — and a common complaint is something called dot crawl. The little dots which make up a television picture seem to be moving slightly and changing colour at the edges. There may also be small wavering lines or areas which can be equally annoying.

Devices which can be connected to a computer are known as peripherals and one useful peripheral is a printer. For any serious programming a printer is essential so that programs can be studied away from the pressures of the

*continued on page 64*

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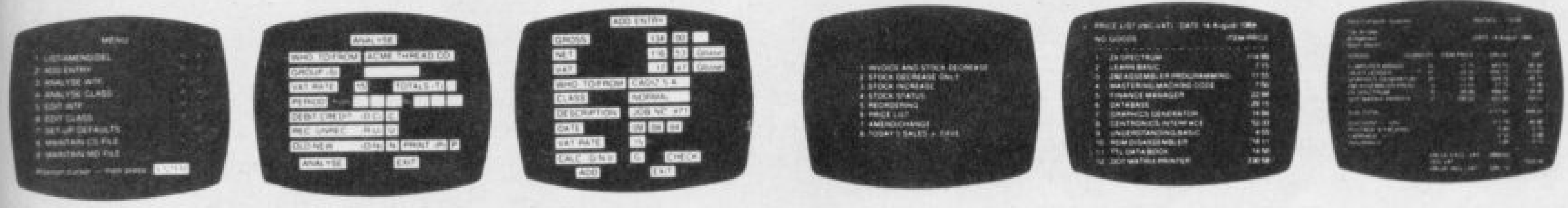
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*continued from page 61*

keyboard and at leisure — a printer is not considered essential for this series. The Alphacom printer uses special paper which is quite expensive, it is rather noisy and slow and is again a compromise. It is inexpensive and for the small amount of use to which it will be put at home it is adequate.

The software scene for the Spectrum is far ranging with all sorts of programs available. A goodly proportion of that software is bought over the counter in the high street and the rest is sold by mail order. There is an element of risk in mail order especially when ordering new titles which may not be as ready as the advertisments suggest, whereas in a shop you can see what you are buying.

Unfortunately for the software producers a growing market exists in pirate software. The knowledge acquired in learning to program is being abused by using this skill to copy software. Software piracy is a relatively new phenomenon and as yet there is not really any legislation to tackle it.

Another source of programs is computer magazines, some of which are devoted almost entirely to printing program listings. Most of those programs are written in Basic and are a good source of teaching material. Typing in, amending and running such programs can greatly help understanding of how they work. Learning the location of all the keys is also achieved.

If you want to progress from running programs and want to know how to program then you will need help. That can be obtained by reading books, following a teaching course, reading magazines or by more active methods such as computer clubs.

There are dozens of books published about the Spectrum, not to mention those about Basic. Many of these books are poor in qualtiy and unless carefully selected might be a disappointment. *Sinclair User* reviews many books and you may find a recommendation which will suit your requirements.

To help you learn your way around the keyboard there is a teaching program on the introductory **Horizons** cassette called Keyboard Trainer. It is well worth working through this program, until you are familiar and happy with the keys and their meanings. It explains the modes, K,L,C,E,G and how to recognise which mode the Spectrum is in and what will happen when a particular key is pressed. Once the use of the keyboard is mastered it will be much easier to type in programs from magazines, you can then learn what all the words and symbols do in a program and eventually progress on to your own programming.

If you are loading and running programs from tapes, or typing in programs from books or magazines, then all you need to know are a few commands — LOAD, RUN, LIST, SAVE, VERIFY and NEW. This is not programming but operating. NEW is a useful command, when used with care, as it causes the Spectrum to restart — almost as if you had turned it off and on. If you do not like a program you have loaded and wish to delete it then NEW will do this most effectively; note that you will still have the copy on cassette tape. LOAD achieves the same thing and




loads another program at the same time from cassette tape. LOAD needs a program name thus:

LOAD "FOOTBALL"

where FOOTBALL is the name of the program on cassette tape.

Once a program is loaded it may run itself or it may need an additional command to start it — RUN. If you have typed in a program then it is very likely that you will use RUN to start it. Before you run it you might need to see a listing in order to correct any typing errors and for that the command LIST is used. LIST will list lines of the program a screen at a time, and to see the next screen you press any key. The lines of a program are numbered, rather like a list of questions. It is possible to use LIST from a particular line thus:

LIST line-number

where line-number is replaced by a line number of the first line you wish to see.

Having typed in the program, run it to see that it works and perhaps correct the odd mistake, then save it to tape for another day with the command SAVE. That takes a copy of the program from the Spectrum to the cassette tape; if you have set the tape recorder controls correctly it will be a good copy otherwise you will have to SAVE it again.

SAVE "CRICKET"

will save the program to tape. The copy should be checked afterwards by a process known as verification. The command VERIFY is similar to LOAD and it compares the tape copy with that still loaded in the Spectrum.

VERIFY "CRICKET"

will do this and if for any reason it cannot verify then the message

R TAPE LOADING ERROR

will be seen. The only course of action then is to SAVE the program again after checking the cassette recorder leads and control settings. This error message may also be seen when a program fails to load.

The ability to edit lines is also considered an essential skill and one which ought to be practised. Lines are checked for mistakes as they are entered. If there is an error then the line is rejected and it has to be corrected before it can be re-entered. That is called syntax checking and means the line is being checked for grammar such as spelling and order of commands. It ensures the line will be understood by the Spectrum when it is run but does not mean the line is wholly correct; you might have given one instruction where you meant another, which is something the computer cannot know.

Incorrect lines can be corrected by the process of editing. The line is recalled, changed and re-entered. The mechanics of the process are covered in the Sinclair manuals and ought to be practised. The best advice on avoiding mistakes when typing in a program is to take care and pay attention to what you are doing — it takes but a little effort at the time and can save considerable trouble later on.

Finally as a taste of the next article in this series type in the following very short program, making sure there is nothing else in the computer either by switching off and on again or typing in NEW:

```
10 PRINT "PROGRAMMING IS FUN"
```

Type RUN and notice how the computer immediately responds by printing the message in quotation marks on the television screen. By reading the Sinclair manual find out how to put this message in the middle of the screen.

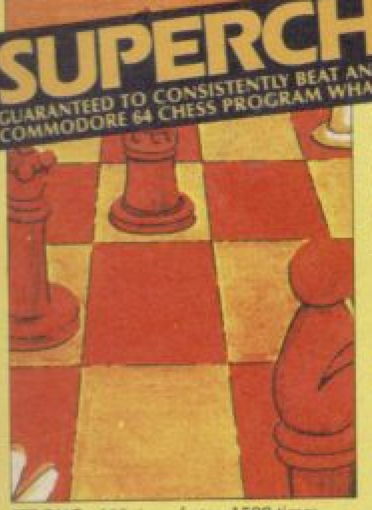
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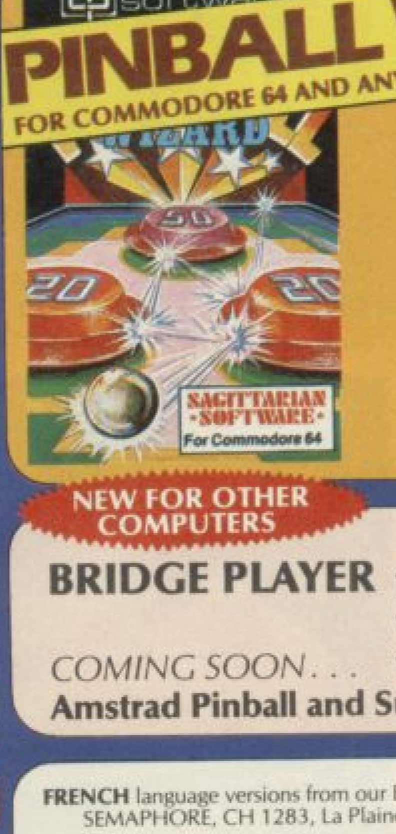
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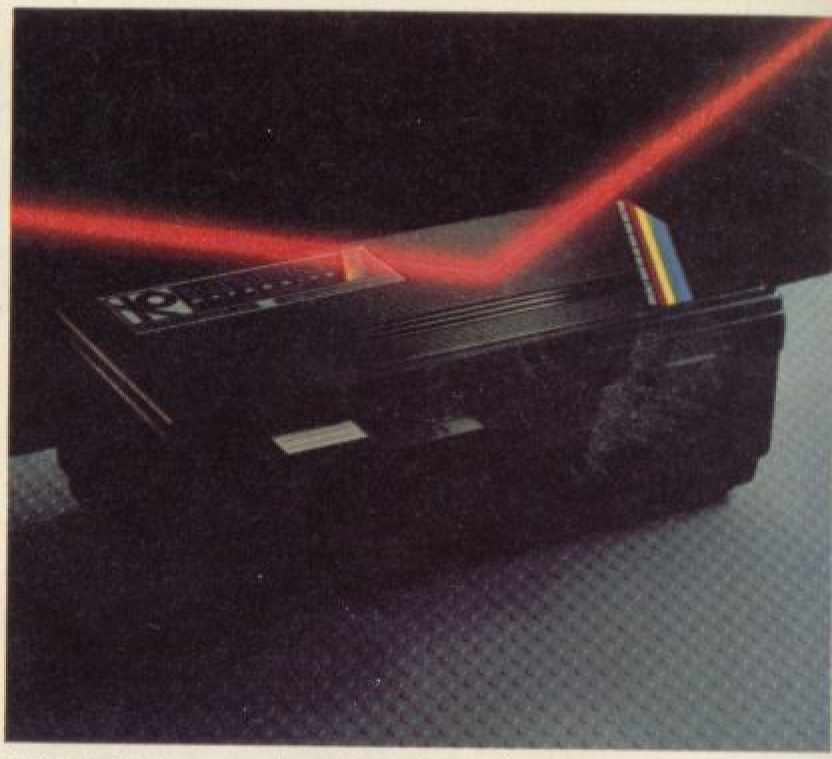


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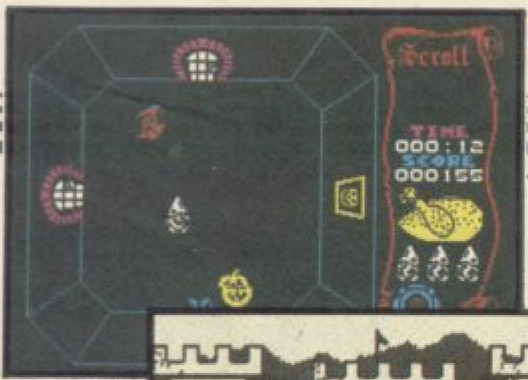
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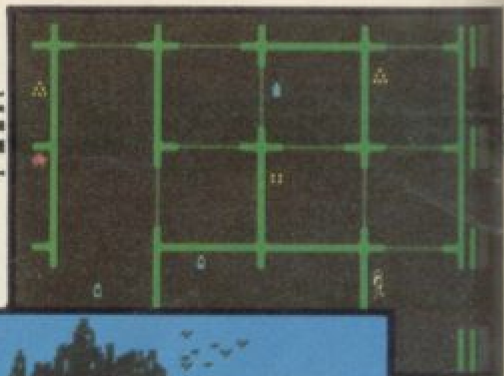
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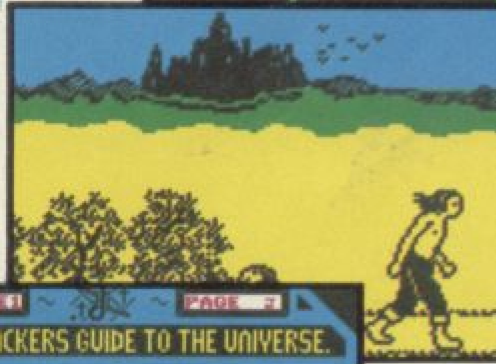


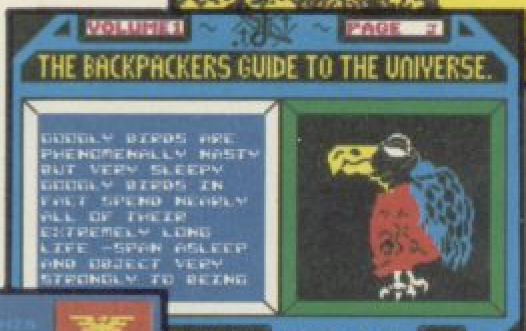
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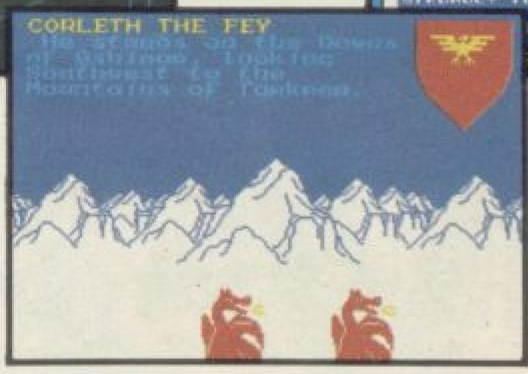
## Richard Price investigates the introduction of arcade and animated graphics into adventures










ONCE UPON a time in the remote era of the early 80s, adventurers knew exactly where they stood.

When they entered a software store they could ask the assistant for an adventure and be fairly sure that they would end up playing a pure text-based game of the Crowther and Woods variety. No frills, no nonsense, no pretty pictures — just a pile of deduction problems without time limits or fast-reaction sections.

Things have changed since then. The increasing sophistication of machines, programmers and users has spelled the end of comfortable assumptions about adventure. More than anything else, the vastly improved graphics capability of home micros has turned this end of the software market into a confused blurred area.

Now there are arcade adventures and graphic adventures, in such profusion and variety that many defy easy definitions.

Early programmers were faced with a simple problem — adding pictures to a text game used up valuable RAM and drastically reduced the memory available for vocabulary. That would result in descriptions bare of any real atmosphere, badly affecting the playability and general appeal of the game.

Pleasant illustrations of the locations were all very well but players were often peeved to find that they had lost a lot of complexity in the trade-off. Purists would sneer at such unnecessary waste, feeling that companies were conceding to the demands of the contemptible arcade market.

Snobbery aside, there is a lot to be said for the adventure untainted by graphics — Artic has produced very fine and difficult games in its perennial A,B,C series whilst Level 9 has programmed some of the very best of British adventures with **Lords of Time** and **Snowball**. Their intricacy is formidable and there is very little doubt that they will remain classics of their type for a long time to come.

Nowadays the majority of commercial adventures use location graphics. Programmers have learnt a great deal about squeezing information to get the best of both worlds — or nearly. Even the most staid, conservative adventure player will not raise an eyebrow to such practices anymore.

It is the power of the arcade game which has begun to exert strong and almost irresistible pressures for change in adventuring. Whatever you feel about them, arcade games, if they are well made, can be utterly compelling, mainly due to their visual qualities. So what is the difference between text adventure and arcade game?

The skills needed for each type are distinct. In style, most arcade productions deal in your understanding and manipulation of spatial relationships. The problems tend to be of a similar type in any one game and require fast reactions and manual agility. Any sort of intellectual input is limited and the range of activities the central character can perform rarely extend beyond two or three physical actions left, right, jump, fly or the like.

Take a look at Miner Willy, or Ziggy, the odd little hero of **The Backpacker's Guide to the Universe**. Nobody would argue that they can do much or that they possess wildly interesting personalities. There are also no other characters to relate to — the 'other' in arcade games is usually something to be destroyed or used in some way.

In text games there is a vast difference. Whereas in the arcade you progress in a simple linear way from screen to screen, in adventure you are provided with an interlinking and mappable world for exploration as you choose. Problems are hidden or obscured in some way and your major activity is mental. The stress is on persistent thought, intuition and deductive thinking, almost always in a verbal form. The visual has played a very minor part until recently. Puzzles will vary, running from codes to wordplays. Above all, you are given far more time to resolve problems, allowing you to reflect and try an alternative strategy.

Personalities abound — through your own imagination you can become

the character you want to be. Other people in the game can also behave in a rudimentary human sort of fashion and your success depends on your ability to understand them rather than your speed at killing them. So far this has simply not been a feasible proposition in arcade games.

Slowly but surely the two species are now beginning to intermingle. Finding the missing links is difficult but there are a few types of game which cry out to be candidates.

Although they may not have been hugely popular the monster mazes can claim some part in the history. In those you travelled through large three-dimensional mazes avoiding dinosaurs or vampires, all the while collecting valuable items. There is no text input of any note in those games but they clearly had an influence on today's animated adventures.

Then along came **Valhalia**, where the vicious and unpredictable inhabitants of the Nordic afterworld come to life before your eyes. The little stick figures walk, eat, fight and die on the screen whilst you take part in their antics in a text adventure of some complexity — players are still racking their brains to find the magical objects and there is no sign of its popularity waning. Animation had arrived with a vengeance and in a way about which traditionalists could not really complain.

The speed of development since **Valhalla** has been astonishing. **Halls of the Things** was a milestone in the use of at least some adventure themes in what was essentially an arcade setting. The labyrinthine cavern of the game has doors, treasures and a variety of swift and deadly monsters all shown in a cellular system of interlocking locations.

Magic spells and combat routines are possible and planning plays a great role in your survival. Manoeuvring and manipulating the central figure is no simple task and jaded D&D players can take time out from their cerebral fantasy by enjoying a visually exciting and mentally taxing bit of cut and thrust.

Halls really set the cat among the pigeons and the companies began falling over one another in their attempts to outprogram the other — no bad thing as there have always been plenty of goats sprinkled amongst the sheep of the industry. Knowing the public has the ability to be discriminating concentrates the mind wonderfully.

More experiments followed. **The Oracle's Cave** took a standard adventure plot, animated the central character's journey through a group of caverns and introduced the idea of the single key process to cover certain actions. The animation is superior to that of **Valhalla** though the game does not have the same area or number of possible actions.

The Cave is interesting but is not very gripping to play. All too often the strict time limit on each quest means that you rarely finish. Dorcas has improved the format and eliminated the constricting time scales in its new game **The Runes of Zendos**, which uses similar animation.

Sprite graphic techniques and the use of various types of three-dimensional image have now brought what are effectively animated cartoons within the reach of the Spectrum user. One leader in this field is Ultimate.

*'Animation had arrived with a vengeance and in a way about which traditionalists could not complain'*

**Atic Atac** can be said to be the first in a new generation of games where adventure motifs are combined with the thrill and visual appeal of the arcade. Pseudo-3D is achieved by the scene being depicted from above. Players can choose their roles and must travel the haunted rooms of the Castle in search of the fabled ACG key. Within the rooms you will find furniture, food, objects and monsters — the very stuff of heroic adventure but all played with a joystick. That is no simple progression from screen to screen and many routes are available to you in your wanderings. The graphics are sharp, fast and smooth.

**Knight Lore**, by the same company, took the art a stage further. It is a strong contender for Game of 1984. The 3D effect is vastly improved and the pictures are worthy of a Disney cartoon.

You are given total directional control over the hero; objects have to be collected and returned to the steaming cauldron somewhere in the castle. That is nothing new.

What is staggering is that objects, furniture — even the masonry — can be moved and used to assist you achieving your goal. Precious objects may well be placed in highly inconvenient places and you will need plenty of the old lateral thinking skills you used in text adventure.

This is an arcade-quality game which can be called an adventure. So, it's not verbal, but it is intelligent and demanding in ways which will appeal to even the most stick-in-the-mud adventurer.

Controlling what amounts to a computer movie is a long way from **Space Invaders** or the original Adventure but it is the way things are moving now. **Tir Na Nog** from Gargoyle has the same filmic quality as **Knight Lore** though in a different style.

Here, deep in the mythical world of Celtic legend you send your hero through a landscape which shows convincing perspective, with fore- middle and backgrounds scrolling to help sustain the illusion. Unlike **Knight Lore**, there are other characters, some of whom may be hostile or helpful, but all living their own lives. Again, the game is almost entirely visual but adopts the style of adventure both in its aims and its enormous scope.

It would be difficult to talk about the new generation of adventures without mentioning **Lords of Midnight** and its sequel. The game is set apart from arcade games by using static location graphics and still retains features of the text adventure. Although it is governed by single key presses for choices the sheer vastness of the land gives you a convincing feel of taking part in the terrible campaign against Evil. The sense of moving slowly through the countryside is quite intense as the terrain 'grows' as you approach features.

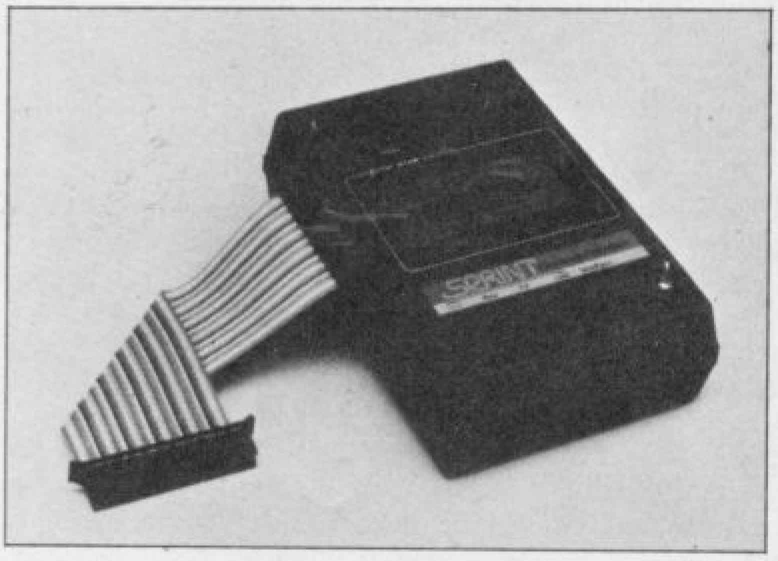
The game has also taken on some of the qualities of strategy and wargaming. You must control the movements of large numbers of troops and vassals to forstall the assaults of the Dark.

Adventure is spreading its wings. There is a synthesis, where all available techniques are being used for the production of games which once tended to stick jealously to their own territories. The idea of separate compartments for adventure, arcade or strategy is becoming outdated.

Serious adventure players should not regard that as a threat to the games they enjoy most. There will always be text adventures just as there will always be pure arcade games. What is

*continued on page 72*

# The SPRINT, loads at four times speed!




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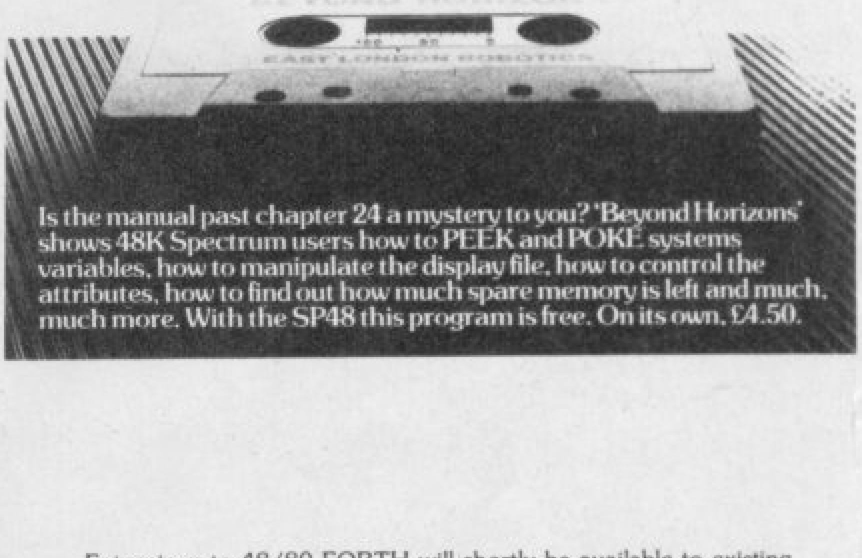
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Is the manual past chapter 24 a mystery to you? 'Beyond Horizons' shows 48K Spectrum users how to PEEK and POKE systems variables, how to manipulate the display file, how to control the attributes, how to find out how much spare memory is left and much, much more. With the SP48 this program is free. On its own, £4.50.

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The SP48 simply plugs into the sockets provided by Sinclair inside your Spectrum and turns your 16k machine into an absolutely standard 48k ready to run 48k programs.

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The SP48 carries our full warranty and all our customers enjoy the benefits of our renowned product support.

And you get a free copy of Beyond Horizons, and educational program which has already enlightened thousands of 48k Spectrum owners about the inner workings of their computers.

## 48/80 FORTH

This compiler and editor is fast becoming recognised as the most professional and highest quality implementation of the FORTH language on the Spectrum. FORTH gives you the speed of machine code without the tedium of machine-code programming.

All the Spectrum's excellent graphics commands are retained including DRAW, PLOT and CIRCLE. Real arcade quality sounds can be produced using BEEP.

More advanced FORTH programmers will find that 48/80 FORTH provides a complete implementation of FIG-FORTH, including the sophistications of BUILDS, DOES and CODE.

Each 48/80 FORTH cassette includes a separate FORTH editor which uses part of RAM as if it were disk. The 48K Spectrum allows a 16k RAM 'disk', while leaving nearly 20k of dictionary space. A comprehensive user-manual is also included, which covers both compiler and editor, and has a lucid beginners introduction.

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EAST LONDON ROBOTICS

*continued from page 69*

exciting is the sudden growth of novel concepts which will add to the repertoire of home computer entertainment.

The more variation, the better; it is healthy for the computing public who will have a wider choice and it is healthy for your imagination. After all, who really wants to be stuck in the same old repetitive rut year after year.

Making predictions is a tricky business — as one or two computer tycoons may well have realised by now — but the likelihood is that computers will stay well within the reach of Joe Public and will get smarter and faster as chip technology improves. Networking should be common soon and video techniques will be enlisted in the search for the game to beat them all. The 'interactive' video cartoon games in the arcades now may well be seen as primitive in a short while. What shape will the networked, truly interactive and fully animated — or filmed — adventure take? Dream on.

# At the sign of THE DANCING OGRE

## At his inn on the moors landlord Gordo Greatbelly dishes out spicy mead and help for adventurers



*NOW, that letter from Janga. I tell you I came near to tapping the messenger's skull with my club when I glanced through it. This miserable Prince Janga, Lord of Maru — a stinking sand-ridden hole if ever I knew one — summoned me to undertake a quest. And, wrote this snivelling fop, if I declined his necromancers would weave a curse so strong that my hair — such as it is — and teeth would drop out and my belly shrink.*

*Well, I am a superstitious man I knew well that Agonnar, his warlock, could achieve this threat. Where would my business be then, eh? What recommendation is a skinny, starveling, bald and gummy landlord? No, I knew I must forsake the comforts of the Ogre for the perils of the road — and at my age too.*

*Let us dwell on other things for the present though. The grim rites of the Priests of Artic still perplex many of you. On* **Espionage Island** *young Ian McCartney of Birmingham cannot leave the trail in the jungle. Consultations with the priesthood reveal that there is little point in wandering from the path — its whole purpose is to lead you to the boat.*

*I have a number of missives requesting help with the journey on the* **Planet of Death.** *I would suggest to the fair Tomlinson of Matlock that the force field can only be passed in this way — first, fire your laser three times at the field. Then hold the mirror and dance. I have been assured that this is the proper spell. She also asks if the green man is of use. My own experience is that he is best put out of the way and is potentially a serious danger.*

*Kathleen Burnett of Frazerburgh is equally stranded. She wishes to know whether there is any other route from the shed besides returning past the ravine. Ma'am, it is the only way. Then there is the prison — escape from here is only possible by bribery. Though it goes against the grain, corruption brings results.*

*John Evans of Merthyr cannot obtain information from the computer on the planet. It seems as if you should first ask for help or a hint. If that achieves nothing then examine whatever you can in the room and keep Looking!*

*So much for that. Shirley Edge of 12 Maelor Court, Overton on Dee, Wrexham, Clwyd wishes to enter* **The Inferno** *but, whatever she does, cannot pass from the Portal into the Circles of Hell. I cannot help her here but those of you have been that way may know.*

*Andrew Willshire has embarked on a* **Classic Adventure** *and is labouring in vain with a vending machine. I think you must first pour oil on it to loosen its workings and then drop any coins you have. It should work well enough then.*

*A metal smith of Nottingham, Ralph Venables by name, cannot even begin his quest yet — he cannot pass the great snake which blocks his way. I hope he has his flute with him — he will need it. Play this flute and you will soon see the serpent sleep. There is more though; when you see it nodding off release your bird and the snake will flee in utter panic.*

*Former deck-hand Neil of the Wood is landbound in the saga of* **Erik The Viking.** *Ah, Neil — this is no mystery to one such as I! If you wish to board the Gold Dragon, Erik's longship, do thus: summon your crew with a horn blast. When they have assembled at the boat-shed, pull the ship down to the shore. Here you can enter the boat at your leisure.*

*Simon Yates watered his steeds at the Ogre whilst returning from* **Kentilla.** *He tells me that saying 'Kentilla' transports the great sword to your hand — useful in a fight. To cross the river Cara adventurers should throw or swing a rope, and pulling the arms from a gargoyle statue within the castle will open a steel door leading to a teleport chamber. Simon could not use the furnace in the castle nor open the desk there. Should you be able to help him he can be contacted at 100a Trentham Road, Langton, Stoke on Trent.*

*So, farewell until we meet again next moon. Zul and Zel have begun packing my weapons and rations — we have ten mules for the purpose. I have little taste for foreign fare and my own beer is still the best. Tomorrow we set off for Maru. Your letters will reach me by the Royal Couriers, so fear not and keep writing.*

**Gordo Greatbelly, landlord**

*If you have a tale to tell, or are in need of a helping hand, write to the Landlord of the Dancing Ogre c/o Sinclair User, Priory Court, 30-32 Farringdon Lane, London ECIR 5BH.*

# Eureka!

DOMARK

16th January 1985

Dear Reader

You've probably heard all about **Eureka!**, the '5 games in one' graphic adventure written by Ian Livingstone with a £25,000 prize. No one has yet won it although many of you are extremely close.

The storylines travel through five time zones of our history - Prehistoric, Roman Empire, Medieval Britain, Colditz and the Caribbean, where you come face to face with the evil Hugo Von Berg. He is holding us all to ransom and demands to be made Emperor of the World, otherwise he will destroy it. A secret telephone number direct to the British Prime Minister has been specially installed for you to ring when you have worked out the secret code which will save us all. You must find this code and decipher the telephone number.

The **Eureka!** Hotline number is:

# 01-460 1115

Ring this at any time to witness Von Berg's evil progress and to check that the prize is still available.

We wish you all the best of luck in your search and to help you on your way, will send you a FREE Guide to Adventure Games (no clues to the £25,000 though!) if you send in a stamp plus your name and address to us.

Happy searching!

Mark Strachan Dominic Wheatley

Managing Directors

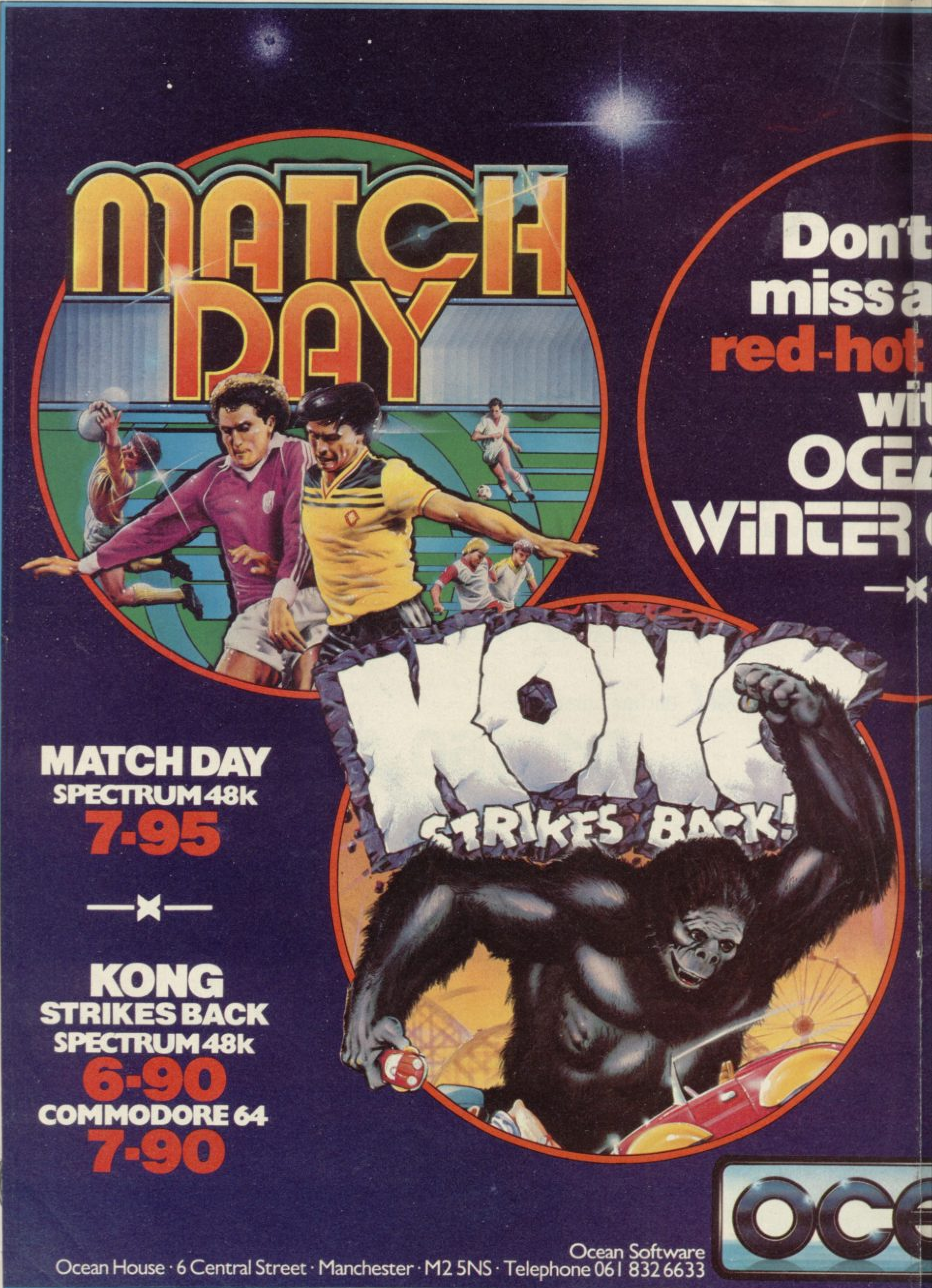
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## HI-RES PROGRAMS FOR THE 16K ZX-81

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# FORTY NINER

In 1849 the Great American Gold Rush started. Almost everyone who could sold up everything and dashed to the west coast to look for this precious metal – including you!

You must excavate this precious metal – but can you survive the giant rats and that vicious Gremlin which will come to infest your mine? Can you trick the snakes into leaving their comfortable nests and destroy the rats for you? Can you keep the Gremlin at bay?

Riches await you – but so do the hazards!

# ROCKET MAN

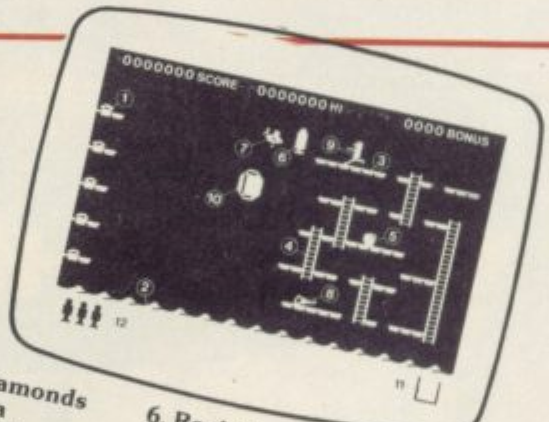
Get rich quick by collecting Diamonds that are simply lying there waiting for you!

Oh . . . I forgot to mention that there are one or two problems!

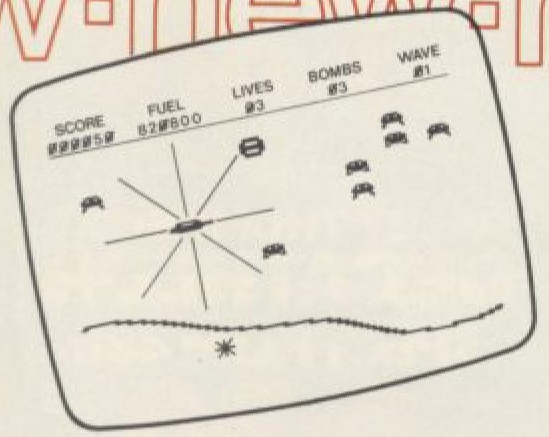
There is an expanse of shark infested water between you and the Diamonds and a strange breed of Bubble that seems hell bent on getting you in it! Somehow you must cross it . . . .

You have a Rocket Pack to help you (a Vulture on higher levels) but you must rush around the platforms and ladders collecting cans of fuel (legs of lamb with the Vulture) and cursing that weird Bubble. Once you have enough fuel then it's Chocks Away!

Oh . . . but don't run out of fuel on the way – otherwise it's . . . SPLASH!




new-new-new-new-new




# Z-XTRICATOR

A long time ago, in a galaxy far, far, away a terrible war took place between two hostile races. Any prisoners taken could not expect to live very long in the hands of their captors. Their only hope lay with a group of valiant warriors – the XTRICATORS – whose task it was to rescue fellow beings from the alien planet's surface. You are about to take on the role of such a warrior . . . .

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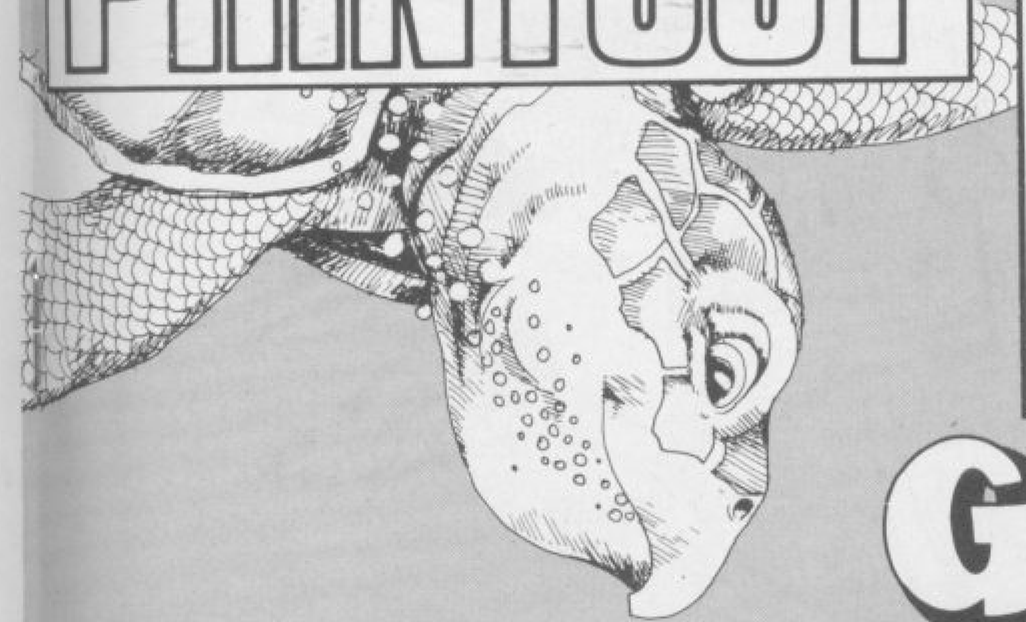
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# PROGRAM PRINTOUT



## GRAPHICS INSTRUCTIONS

Instructions for graphics characters are printed in lower-case letters in our listings. They are enclosed by brackets and separated by colons to distinguish them and the brackets and colons should not be entered.

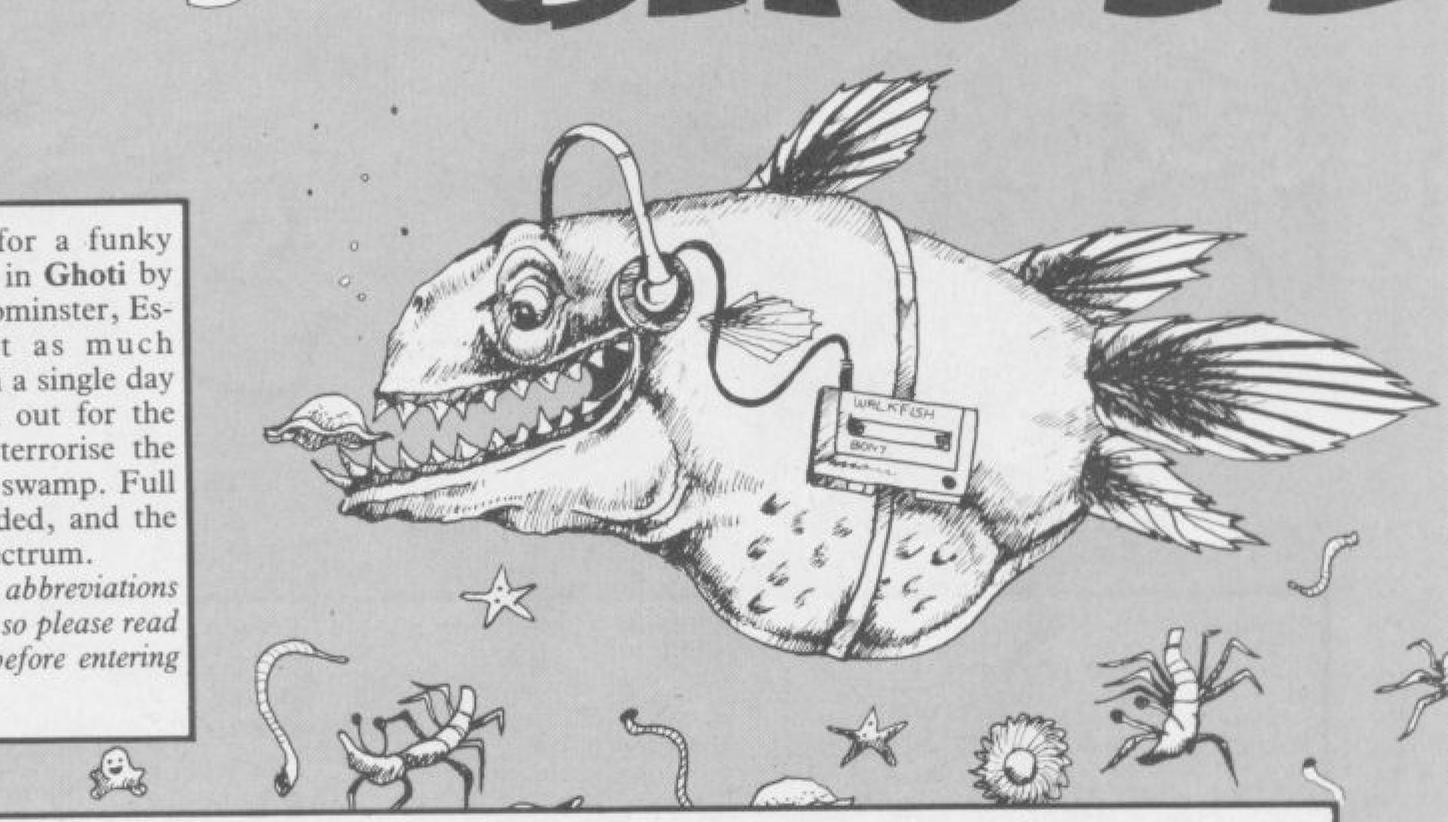
Inverse characters are represented by the letter "i" and graphics characters by "g". Thus an inverse W would be represented by "iw", a graphics W by "gw", and an inverse graphics W by "igw".

Spaces are represented by "sp" and inverse spaces by "isp". Whenever any character is to be used more than once, the number of times it is to be used is shown before it, together with a multiplication sign. Thus "6*isp" means six inverse spaces and "(g4:4*i4:g3)" would be entered as a graphic four, followed by an inverse four repeated four times, followed by a graphics three. Control codes appear with cc before the appropriate key. They are obtained by pressing Caps Shift while in Extended mode.

Where whole words are to be written in inverse letters they appear in the listings as lower-case letters. Letters to be entered in graphics mode on the Spectrum are underlined.

Inverse characters may be entered on the ZX-81 by changing to graphics mode and then typing the appropriate characters and on the Spectrum by changing to inverse video and typing the appropriate letters. Graphics characters may be entered on the ZX-81 by changing to graphics mode and then pressing symbol shift while the appropriate characters are entered. On the Spectrum graphics characters may be obtained by changing to graphics mode and then pressing the appropriate character. User-defined graphics will appear as normal letters until the program has been RUN.

# GHOTI

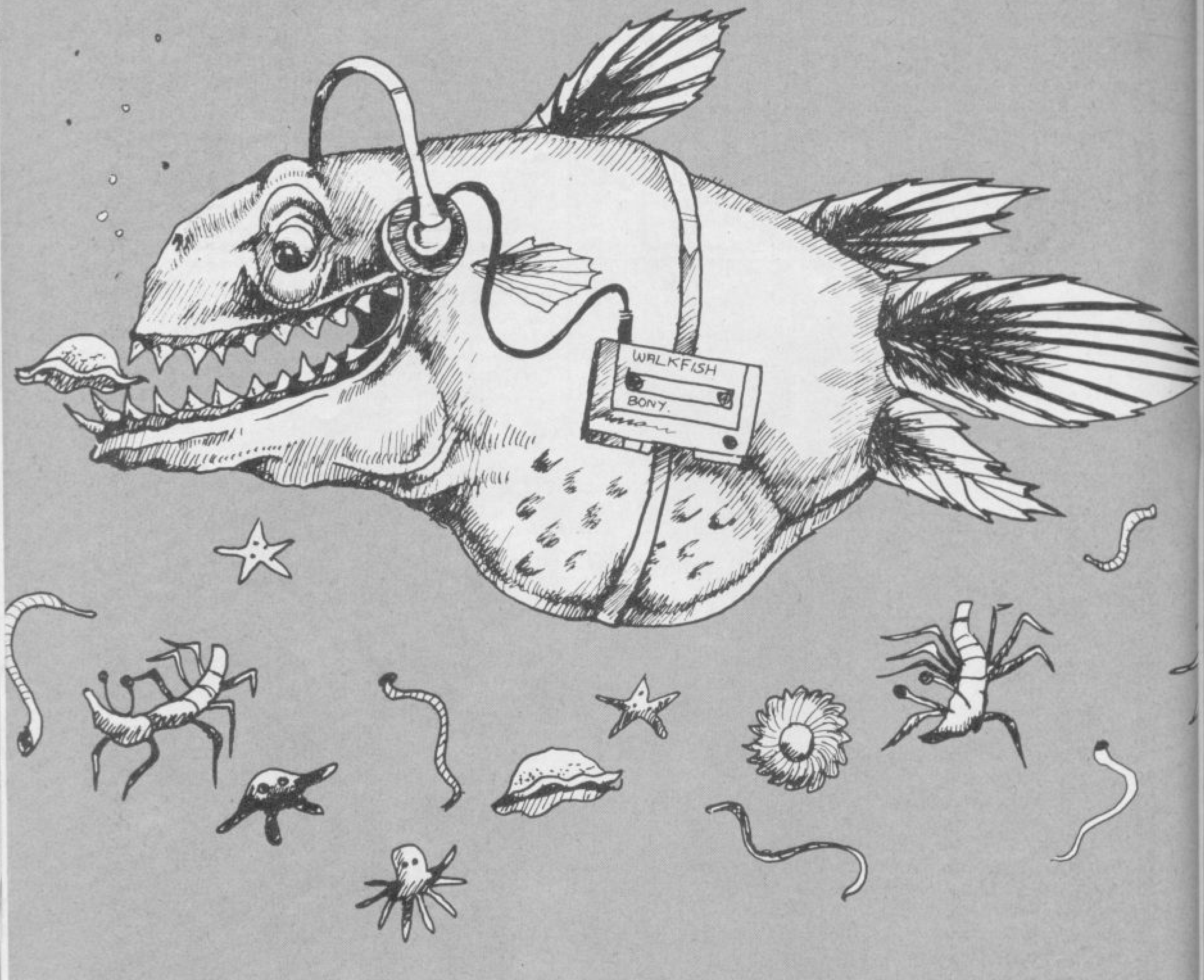



A TASTY dish for a funky fish awaits you in **Ghoti** by K Jefford of Upminster, Essex. You must eat as much plankton as you can in a single day to survive, but watch out for the diving turtles which terrorise the denizens of your cosy swamp. Full instructions are provided, and the game runs on any Spectrum.

*Ghoti uses our special abbreviations for graphics characters, so please read the above instructions before entering the program.*

```
   1 REM   "GHOTI"
   5 BORDER 1: PAPER 7: INK 2
   6 GO TO 9100
   8 GO SUB 1000
  20 GO TO 500
 100 REM   NEXT BUBBLE RUN
 121 LET y=y+RND*2
 122 PLOT 0,120: DRAW 255,0
 123 PRINT AT 0,0; BRIGHT 1; INK
 4: INVERSE 1;"(2*sp)LIVES LEFT:
";lives
 125 IF y>=29 OR y<=2 THEN  LET
y=y-2
 126 PRINT AT a,b;"(2*sp)"
 127 PRINT AT x,y; INK 2;"O"
 135 FOR d=1 TO 2
 140 LET a$=INKEY$
 147 LET a=a+(a$="6")-(a$="7")
 148 LET b=b+(a$="8")-(a$="5")
 150 IF a<=7 THEN  LET a=7: IF b
<=1 THEN  LET b=1
 151 IF a>=15  THEN  LET a=15
 152 IF b>=29 THEN  LET b=29
 153 NEXT d
 154 IF INKEY$="5" THEN  PRINT A
T a,b:  INK 1;"CE": BEEP .01,3:
GO TO 156
 155 PRINT AT a,b; INK 1;"DE": B
EEP .0 1,2
 156 LET time=time-1: PRINT AT 1
,0: INK 3; BRIGHT 1; INVERSE 1:"
 TIME LEFT:";time
 157 IF ATTR (a,b)=ATTR (x,y) TH
EN  GO TO 600
 158 IF x<=7 THEN  GO TO 6000
 159 PRINT AT 0,16; INVERSE 1; B
RIGHT 1;"BUBBLES EATEN:";bcount
 160 IF bcount=10 THEN  GO TO 89
90
 162 IF time<100 THEN  PRINT AT
1,13: INK 3;"(igB)": IF time<=9
THEN  PRINT AT 1,12; INK 3;"(igB
)"
 164 IF time=0 THEN  GO TO 7500
 165 PRINT AT x,y;"(sp)"
 350 LET x=x-1: IF x=6 THEN  GO
TO 500
 360 IF INT (RND*20)=1 THEN  GO
TO 7000
 480 GO TO 120
 499 REM   BUBBLE  SET UP
 500 LET y=INT (RND*25): LET x=2
1-INT (RND*6): GO TO 24
 600 LET bcount=bcount+1: PRINT
AT a,b;"(sp)": PRINT AT x,y;"(sp
)": GO TO 20
 999 REM  GRAPHICS  SET UP
1000 FOR n=0 TO 31
1060 FOR a=21-INT (RND*7) TO 21
1070 PRINT AT a,n; INK INT (RND*
6);"O"
1075 NEXT a: NEXT n
1080 FOR f=0 TO 54:  READ t: POK
E USR "a"+f,t: NEXT f: RESTORE
1100 DATA 131,71,111,127,127,127
,95,143,192,224,208,216,253,248,
240,192
1125 DATA 16,16,17,146,84,40,0,2
39
1130 DATA 3,7,15,27,63,31,15,3,1
93,224,246,254,254,254,250,241
1140 DATA 192,224,240,240,247,25
5,224,112,7,63,255,127,63,239,19
9
1930 LET a=12: LET b=5
1935 LET bcount=0
```

*continued on page 78*




*continued from page 77*

```
1936 LET c=0
1937 LET LIVES=4
1950 RETURN
5999 REM   BUBBLE  BURST
6100 PRINT AT 7,y;"(sp)": FOR z=
1 TO 30 STEP 2: BEEP .001,z: PRI
NT AT 6,y;"C": NEXT z: PRINT AT
6,y;"(sp)"
6300 GO TO 159
6999 REM   DIVING  TURTLES
7000 FOR j=1 TO INT (RND*5)
7009 LET h=INT (RND*17)
7010 LET f=INT (RND*12)
7011 LET cr=0: FOR r=.01 TO .100
 STEP 5: FOR s=1 TO 20: BEEP r,s
: NEXT s: NEXT r: LET cr=cr+1: I
F cr=5 THEN  GO TO 7012
7012 LET t=lives
7013 LET cr=0
7020 FOR l=6 TO 0 STEP -1
7030 PRINT AT 9+f-l,10+h-l; INK
3;"GF"
7035 IF ATTR (a,b)=ATTR (9+f-l,1
0+h-l) THEN  LET lives=lives-1:
IF lives=0 THEN  GO TO 8000
7040 PAUSE 4: PRINT AT 9+f-l,10+
h-l;"(2*sp)"
7050 NEXT l
7060 FOR o=9 TO 7 STEP -1
7070 PRINT AT -o,-20-h+o; INK 3;
"GF"
7075 IF ATTR (a,b)=ATTR (-o,-20-
h+o) THEN  LET lives=lives-1: IF
 lives=0 THEN  GO TO 7910
7080 PAUSE 10: PRINT AT -o,-20-h
+o;"(2*sp)"
7085 IF t<>lives THEN  GO TO 120
7090 NEXT o
7091 NEXT j
7100 GO TO 120
7500 REM  LOSER!
7501 IF INKEY$<>"" THEN  GO TO 7
501
7510 CLS : PRINT AT 10,6;"YOU ST
ARVED TO DEATH"
7520 FOR N=0 TO 10: BEEP .1,12-N
: BORDER INT (RND*6)+1: INK 9: N
EXT N
7530 GO TO 8000
7900 REM   GAME  END
7910 PRINT AT 10,8;"EATEN ALIVE!
": PAUSE 50
8000 CLS : PRINT AT 10,8:"ANOTHE
R GAME?": PAUSE 0: IF INKEY$="y"
 OR INKEY$="Y" THEN  CLS : GO TO
 9150
8010 STOP
8990 REM   NEXT  GAME
8995 IF INKEY$<>"' THEN  GO TO 8
995
9000 CLS : PRINT AT 8,2:"CONGRAT
ULATIONS! YOU SURVIVED"''"  A D
AY IN THE SWAMP."''''" FEELING MO
RE SKILLFUL, PERHAPS?"
9015 PAUSE 150: GO TO 9150
9030 RETURN
9100 REM  INSTRUCTIONS
9132 BORDER 3: PRINT AT 3,10: IN
K 3: INVERSE 1:"G H O T I"
9135 PRINT AT 7,3:"GHOTI is the
phonetic"''" spelling of the wor
d fish."''"  You are a pescatori
al predator"''" hunting the smal
l bubble-like"''" plankton which
 rise from the"''" primordial sl
ime."''TAB 3; INVERSE 1:"PRESS A
NY KEY TO CONTINUE"
9136 PAUSE 0
9140 CLS : PRINT AT 5,2;"Choose
your level of skill"''" then spe
nd your first day in"''" your ne
w home. But beware! When"''" the
 diving turtles are around"''" e
verything in the swamp goes"''"
still! how many days will YOU"''
" survive?"
9145 PRINT AT 20,3; INVERSE 1:"P
RESS ANY KEY TO CONTINUE"
9146 PAUSE 0: IF INKEY$="" THEN
 GO TO 9146
9150 CLS : BORDER 6: PRINT AT 8,
6; INVERSE 1; INK 3;"WHAT SKILL
LEVEL?"''"      (9=easy,1=expert!
)"
9151 FOR n=0 TO 10: BORDER INT (
RND*6)+1: BEEP .1,n*2+INT (RND*1
0): NEXT n
9152 PAUSE 0
9155 LET time=VAL INKEY$*40
9156 IF time<30 OR time>360 THEN
  GO TO 9151
9160 CLS
9167 GO TO 8
```

# Q-Bert

Paint the steps of the pyramid but avoid the boulders which tumble down in **Q-Bert** by Simon Godfrey of Chesterfield, Derbyshire. The most colourful paint available is grey, as the game is for the 16K ZX-81, but do not let that put you off.

Full instructions are contained within the program, and Simon has thoughtfully provided REM statements in front of the graphics lines to make it easier for you to count off the number of spaces and graphics characters.




```
  1 LET HI=0
  2 GOSUB 225
  3 DIM A(15)
  4 DIM B(15)
  5 DIM A$(15)
  6 LET A(1)=4
  7 LET A(2)=7
  8 LET A(3)=7
  9 LET A(4)=10
 10 LET A(5)=10
 11 LET A(6)=10
 12 LET A(7)=13
 13 LET A(8)=13
 14 LET A(9)=13
 15 LET A(10)=13
 16 LET A(11)=16
 17 LET A(12)=16
 18 LET A(13)=16
 19 LET A(14)=16
 20 LET A(15)=16
 21 LET B(1)=15
 22 LET B(2)=13
 23 LET B(3)=17
 24 LET B(4)=11
 25 LET B(5)=15
 26 LET B(6)=19
 27 LET B(7)=9
 28 LET B(8)=13
 29 LET B(9)=17
 30 LET B(10)=21
 31 LET B(11)=7
 32 LET B(12)=11
 33 LET B(13)=15
 34 LET B(14)=19
 35 LET B(15)=23
 36 LET SC=0
 37 LET SH=1
 38 LET LI=3
 39 LET BERT=5
 40 LET BALL=0
 41 LET BF=0
 42 LET NO=0
 43 LET L$=" "
 44 LET R$=" "
 45 FOR X=1 TO 15
 46 LET A$(X)="N"
 47 NEXT X
 48 PRINT AT 0,0;"SCORE ";SC;TA
B 22;"HIGH ";HI;AT 1,0;"SHEET ";
TAB 22;"LIVES ";"     "( TO LI)
 49 PRINT AT 1,6;SH;AT 1,6;" ";
AT 1,6;" ";AT 1,6;SH;AT 1,6;" ";
AT 1,6;" ";AT 1,6;SH;AT 1,6;" ";
AT 1,6;" ";AT 1,6;SH;AT 1,6;" ";
AT 1,6;" ";AT 1,6;SH
 50 REM XXXXXXXXXXXXXXXXXXXXXXXX
 51 PRINT AT 4,16;"   "
 52 REM XXXXXXXXXXXXXXXXXXXXXXXX
 53 PRINT "
 54 REM XXXXXXXXXXXXXXXXXXXXXXXX
 55 PRINT "
 56 REM XXXXXXXXXXXXXXXXXXXXXXXX
 57 PRINT "
 58 REM XXXXXXXXXXXXXXXXXXXXXXXX
 59 PRINT "
 60 REM XXXXXXXXXXXXXXXXXXXXXXXX
 61 PRINT "
 62 REM XXXXXXXXXXXXXXXXXXXXXXXX
 63 PRINT "
 64 REM XXXXXXXXXXXXXXXXXXXXXXXX
 65 PRINT "
 66 PRINT AT 11,7;"  ";AT 12,5;"
    ";AT 13,6;"    ";AT 11,25;"
";AT 12,23;"     ";AT 13,24;"   "
 67 GOSUB 69
 68 GOTO 71
 69 PRINT AT A(BERT),B(BERT);"
  ";AT A(BERT)+1,B(BERT);"   ";A
T A(BERT)+2,B(BERT);"   "
 70 RETURN
 71 IF BF=0 THEN IF SH>3 OR INT
(RND*(4-SH))+1=1 THEN LET BF=1
 72 IF BF=1 THEN GOSUB 211
 73 IF INKEY$="1" THEN GOTO 80
 74 IF INKEY$="Z" THEN GOTO 93
 75 IF INKEY$="O" THEN GOTO 105
 76 IF INKEY$="M" THEN GOTO 118
 77 IF INKEY$="P" THEN GOTO 130
 78 IF INKEY$="A" THEN GOTO 135
 79 GOTO 71
 80 IF BERT=1 OR BERT=2 OR BERT
=4 OR BERT=7 AND L$=" " OR BERT=
11 THEN GOTO 140
 81 IF A$(BERT)="Y" THEN GOTO 8
5
 82 LET A$(BERT)="Y"
 83 LET SC=SC+10
 84 PRINT AT 0,6;SC
 85 LET NO=NO+1
 86 PRINT AT A(BERT),B(BERT);"
 ";AT A(BERT),B(BERT);(" " AND
BERT<>1 AND BERT<>2 AND BERT<>4
AND BERT<>7 AND BERT<>11);AT A(B
ERT),B(BERT)+2;(" " AND BERT<>1
AND BERT<>3 AND BERT<>6 AND BERT
<>10 AND BERT<>15);AT A(BERT)+1,
B(BERT);"   ";AT A(BERT)+2,B(BER
T);"   "
 87 IF BERT=7 THEN GOTO 189
 88 LET BERT=BERT-(2 AND BERT>2
)-(1 AND BERT>4)-(1 AND BERT>7)-
(1 AND BERT>11)
 89 PRINT AT A(BERT),B(BERT);"
  ";AT A(BERT)+1,B(BERT);"   ";A
T A(BERT)+2,B(BERT);"   "
 90 IF BERT=BALL THEN GOTO 151
 91 IF NO=15 THEN GOTO 168
 92 GOTO 71
 93 IF BERT>10 THEN GOTO 140
 94 IF A$(BERT)="Y" THEN GOTO 9
9
 95 LET A$(BERT)="Y"
 96 LET SC=SC+10
 97 PRINT AT 0,6;SC
 98 LET NO=NO+1
 99 PRINT AT A(BERT),B(BERT);"
 ";AT A(BERT),B(BERT);(" " AND
BERT<>1 AND BERT<>2 AND BERT<>4
AND BERT<>7 AND BERT<>11);AT A(B
ERT),B(BERT)+2;(" " AND BERT<>1
AND BERT<>3 AND BERT<>6 AND BERT
<>10 AND BERT<>15);AT A(BERT)+1,
B(BERT);"   ";AT A(BERT)+2,B(BER
T);"   "
100 LET BERT=BERT+(1 AND BERT>=
1)+(1 AND BERT>1)+(1 AND BERT>3)
+(1 AND BERT>6)
101 PRINT AT A(BERT),B(BERT);"
  ";AT A(BERT)+1,B(BERT);"   ";A
T A(BERT)+2,B(BERT);"   "
102 IF BERT=BALL THEN GOTO 151
103 IF NO=15 THEN GOTO 168
104 GOTO 71
105 IF BERT=1 OR BERT=3 OR BERT
=6 OR BERT=10 AND R$=" " OR BERT
=15 THEN GOTO 140
106 IF A$(BERT)="Y" THEN GOTO 1
11
107 LET A$(BERT)="Y"
108 LET SC=SC+10
109 PRINT AT 0,6;SC
110 LET NO=NO+1
111 PRINT AT A(BERT),B(BERT);"
 ";AT A(BERT),B(BERT);(" " AND
BERT<>1 AND BERT<>2 AND BERT<>4
AND BERT<>7 AND BERT<>11);AT A(B
ERT),B(BERT)+2;(" " AND BERT<>1
AND BERT<>3 AND BERT<>6 AND BERT
<>10 AND BERT<>15);AT A(BERT)+1,
B(BERT);"   ";AT A(BERT)+2,B(BER
T);"   "
112 IF BERT=10 THEN GOTO 200
113 LET BERT=BERT-(1 AND BERT>1
)-(1 AND BERT>3)-(1 AND BERT>6)-
(1 AND BERT>10)
114 PRINT AT A(BERT),B(BERT);"
  ";AT A(BERT)+1,B(BERT);"   ";A
T A(BERT)+2,B(BERT);"   "
115 IF BERT=BALL THEN GOTO 151
116 IF NO=15 THEN GOTO 168
117 GOTO 71
118 IF BERT>10 THEN GOTO 140
119 IF A$(BERT)="Y" THEN GOTO 1
24
120 LET A$(BERT)="Y"
121 LET SC=SC+10
122 PRINT AT 0,6;SC
123 LET NO=NO+1
124 PRINT AT A(BERT),B(BERT);"
 ";AT A(BERT),B(BERT);(" " AND
BERT<>1 AND BERT<>2 AND BERT<>4
AND BERT<>7 AND BERT<>11);AT A(B
ERT),B(BERT)+2;(" " AND BERT<>1
AND BERT<>3 AND BERT<>6 AND BERT
<>10 AND BERT<>15);AT A(BERT)+1,
B(BERT);"   ";AT A(BERT)+2,B(BER
T);"   "
125 LET BERT=BERT+(2 AND BERT>0
```

*continued on page 80*



*continued from page 79*

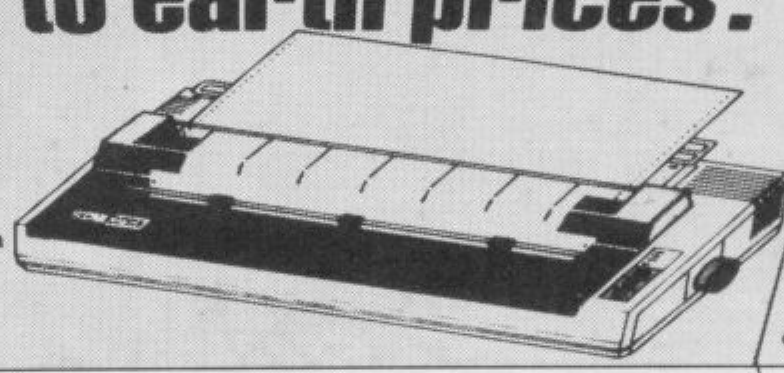
```
)+(1 AND BERT>1)-(1 AND BERT>3)+(1 AND BERT>6)
 126 PRINT AT A(BERT),B(BERT);"  ";AT A(BERT)+1,B(BERT);"   ";AT A(BERT)+2,B(BERT);"  "
 127 IF BERT=BALL THEN GOTO 151
 128 IF NO=15 THEN GOTO 168
 129 GOTO 71
 130 PRINT AT 21,12;"PAUSED."
 131 IF INKEY$="P" THEN GOTO 131
 132 IF INKEY$<>"P" THEN GOTO 132
 133 PRINT AT 21,12;"      "
 134 GOTO 71
 135 PRINT AT 1,28;"   "
 136 PRINT AT 21,5;"Y O U   G A V E   U P"
 137 FOR T=1 TO 40
 138 NEXT T
 139 GOTO 158
 140 FOR T=1 TO 20
 141 PRINT AT A(BERT)+1,B(BERT)+1;" ";AT A(BERT)+1,B(BERT)+1;" "
 142 NEXT T
 143 PRINT AT 21,5;"Y O U   F E L L   O F F"
 144 FOR T=1 TO 20
 145 PRINT AT A(BERT)+1,B(BERT)+1;" ";AT A(BERT)+1,B(BERT)+1;" "
 146 NEXT T
 147 LET LI=LI-1
 148 IF LI=-1 THEN GOTO 158
 149 CLS
 150 GOTO 39
 151 PRINT AT 21,1;"H I T   B Y   T H E   B A L L"
 152 FOR T=1 TO 40
 153 NEXT T
 154 LET LI=LI-1
 155 IF LI=-1 THEN GOTO 158
 156 CLS
 157 GOTO 39
 158 PRINT AT 3,11;"GAME OVER."
 159 FOR T=1 TO 50
 160 NEXT T
 161 IF SC>HI THEN LET HI=SC
 162 PRINT AT 0,27;HI
 163 PRINT AT 3,13;"AGAIN? (Y/N)"
 164 IF INKEY$="N" THEN NEW
 165 IF INKEY$<>"Y" THEN GOTO 164
 166 CLS
 167 GOTO 36
 168 FOR T=1 TO 11
 169 PRINT AT T-1,0;"                                ";AT 22-T,0;"                                "
 170 NEXT T
 171 FOR T=1 TO 11
 172 PRINT AT 11-T,0;"                                ";AT 10+T,0;"                                "
 173 NEXT T
 174 FOR T=1 TO 11
 175 PRINT AT 11-T,0;"                                ";AT 10+T,0;"                                "
 176 NEXT T
 177 LET SC=SC+50
 178 PRINT AT 21,0;"C L E A R E D ,  B O N U S = 5 0"
 179 FOR T=1 TO 30
 180 NEXT T
 181 PRINT AT 21,0;"  D I S C   B O N U S = ";("2 5" AND L$=" " AND R$=" ");("2 5" AND L$=" " AND R$=" ");("0" AND L$=" " AND R$=" ");("5 0" AND L$=" " AND R$=" ");"   "
 182 IF L$=" " THEN LET SC=SC+25
 183 IF R$=" " THEN LET SC=SC+25
 184 FOR T=1 TO 30
 185 NEXT T
 186 LET SH=SH+1
 187 CLS
 188 GOTO 39
 189 PRINT AT 10,6;"   ";AT 11,6;"   ";AT 12,6;"   "
 190 LET BERT=1
 191 FOR T=10 TO 4 STEP -1
 192 PRINT AT T,6;"   ";AT T+1,6;"   ";AT T+2,5;"     ";AT T+3,5;"     ";AT T+4,6;"   "
 193 NEXT T
 194 FOR T=6 TO 9
 195 PRINT AT 4,T;"   ";AT 5,T;"   ";AT 6,T-1;"     ";AT 7,T;"   "
 196 NEXT T
 197 PRINT AT 4,10;"   ";AT 5,10;"   ";AT 6,9;"     ";AT 7,10;"   "
 198 LET L$=" "
 199 GOTO 89
 200 PRINT AT 10,24;"   ";AT 11,24;"   ";AT 12,24;"   "
 201 LET BERT=1
 202 FOR T=10 TO 4 STEP -1
 203 PRINT AT T,24;"   ";AT T+1,24;"   ";AT T+2,23;"     ";AT T+3,23;"     ";AT T+4,24;"   "
 204 NEXT T
 205 FOR T=24 TO 20 STEP -1
 206 PRINT AT 4,T;"   ";AT 5,T;"   ";AT 6,T-1;"     ";AT 7,T;"   "
 207 NEXT T
 208 PRINT AT 4,20;"   ";AT 5,20;"   ";AT 6,19;"     ";AT 7,20;"   "
 209 LET R$=" "
 210 GOTO 114
 211 IF BALL>0 THEN GOTO 214
 212 LET BALL=1
 213 GOTO 219
 214 PRINT AT A(BALL),B(BALL)+1;(" " AND A$(BALL)="N");(" " AND A$(BALL)="Y");AT A(BALL),B(BALL);(" " AND BALL<>1 AND BALL<>2 AND BALL<>4 AND BALL<>7 AND BALL<>11);AT A(BALL),B(BALL)+2;(" " AND BALL<>1 AND BALL<>3 AND BALL<>6 AND BALL<>10 AND BALL<>15)
 215 PRINT AT A(BALL)+1,B(BALL);("   " AND A$(BALL)="N");("   " AND A$(BALL)="Y")
 216 PRINT AT A(BALL)+2,B(BALL);" ";(" " AND A$(BALL)="N");(" " AND A$(BALL)="Y");" "
 217 IF BALL>10 THEN GOTO 222
 218 LET BALL=BALL+(1 AND BALL>=1)+(1 AND BALL>1)+(1 AND BALL>3)+(1 AND BALL>6)+(1 AND RND<.5)
 219 PRINT AT A(BALL),B(BALL);"   ";AT A(BALL)+1,B(BALL);"   ";AT A(BALL)+2,B(BALL);"   "
 220 IF BALL=BERT THEN GOTO 151
 221 RETURN
 222 LET BF=0
 223 LET BALL=0
 224 RETURN
 225 CLS
 226 PRINT ,,"                Q*BERT!                FROM SIMON-SOFTWARE"
 227 PRINT AT 10,12;"1      0";AT 11,13;"      ";AT 12,6;"P=PAUSE KEYS A=ABORT";AT 13,13;"      ";AT 14,12;"2      M"
 228 PRINT AT 21,0;"PRESS ANY KEY TO START THE GAME."
 229 LET A=0
 230 LET X=14
 231 IF INKEY$<>"" THEN LET A=1
 232 IF INKEY$="" THEN LET A=0
 233 LET Y=INT (RND*2)
 234 LET X=X-(Y=0 AND X>0)+(Y=1 AND X<26)
 235 PRINT AT 17,X;"    ";AT 18,X;"    ";AT 19,X;" ";("  " AND Y=0);("  " AND Y=1);" "
 236 IF INKEY$<>"" AND A=0 THEN GOTO 238
 237 GOTO 232
 238 CLS
 239 RETURN
9000 POKE 16418,0
9001 REM XXXXXXXXXXXXXXXXXXXXXXXXXX
9002 PRINT "           XXXX           "
9003 REM XXXXXXXXXXXXXXXXXXXXXXXXXX
9004 PRINT "                          "
9005 REM XXXXXXXXXXXXXXXXXXXXXXXXXX
9006 PRINT "                          "
9007 REM XXXXXXXXXXXXXXXXXXXXXXXXXX
9008 PRINT "       XXXXX   X          "
9009 REM XXXXXXXXXXXXXXXXXXXXXXXXXX
9010 PRINT "                   STARRING HARRY"
9011 REM XXXXXXXXXXXXXXXXXXXXXXXXXX
9012 PRINT "                          "
9013 REM XXXXXXXXXXXXXXXXXXXXXXXXXX
9014 PRINT "                          "
9015 REM XXXXXXXXXXXXXXXXXXXXXXXXXX
9016 PRINT "                          "
9017 REM XXXXXXXXXXXXXXXXXXXXXXXXXX
9018 PRINT "                          "
9019 REM XXXXXXXXXXXXXXXXXXXXXXXXXX
9020 PRINT "                          "
9021 REM XXXXXXXXXXXXXXXXXXXXXXXXXX
9022 PRINT "                          "
9023 REM XXXXXXXXXXXXXXXXXXXXXXXXXX
9024 PRINT "               FROM SIMON SOFTWARE."
9025 REM XXXXXXXXXXXXXXXXXXXXXXXXXX
9026 POKE 16418,2
9027 SAVE "Q+BERT"
9028 IF INKEY$<>"" THEN GOTO 9028
9029 IF INKEY$="" THEN GOTO 9029
9030 RAND
9031 RUN
```

*more programs on page 85*

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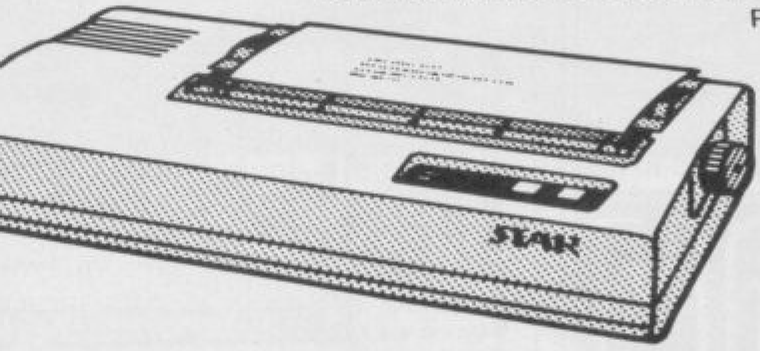
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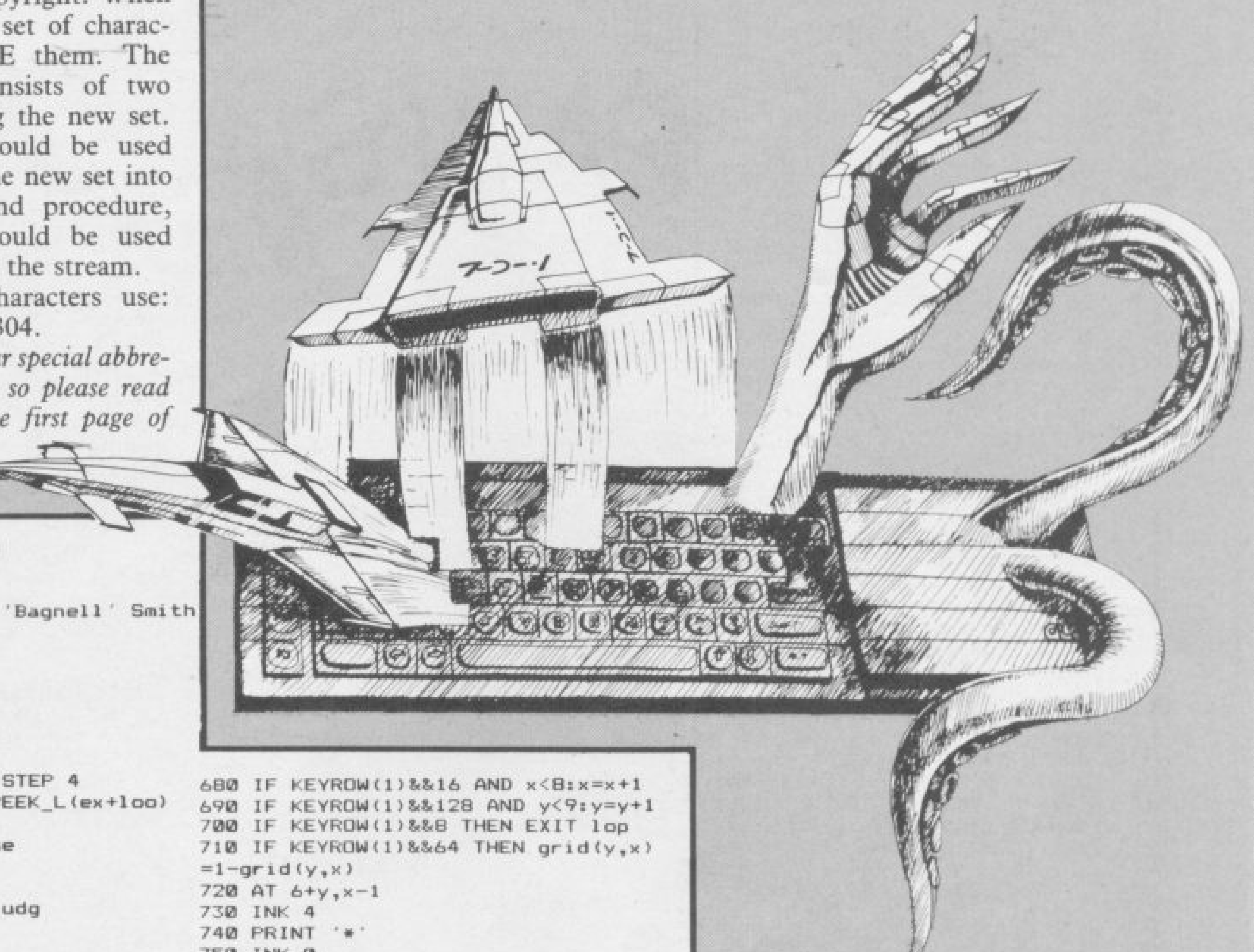
THE QL has excellent graphics potential, but little help is given by the manual to realise it. Philip Smith of Biggin Hill, Kent has written two programs to define your own characters.

The first listing enables you to redefine any part of the character set from space to copyright. When you have your new set of characters, you can SAVE them. The second program consists of two procedures for using the new set. Procedure 'udg' should be used once and LOADs the new set into memory. The second procedure, 'start char set,' should be used every time you open the stream.

To return the characters use: POKE L 167722,41304.

*The program uses our special abbreviations for graphics, so please read the instructions on the first page of Program Printout.*

# QL Characters



## Listing one

```
110 REMark
120 REMark By Philip 'Bagnell' Smith
130 REMark

150 MODE 4
160 instructions
170 INK #2,2
180 ex=PEEK_L(167722)
190 base=RESPR(1024)
200 FOR loo=0 TO 875 STEP 4
210 POKE_L base+loo,PEEK_L(ex+loo)
220 END FOR loo
230 POKE_L 167722,base
240 udg
250 :
260 DEFine PROCedure udg
270 REPeat loop
280 PAPER 4:INK 0
290 CLS
300 CSIZE 1,0
310 FOR f=32 TO 127:PRINT CHR$(f);
320 PRINT \\'Select the character
to be re-defined'\'by entering it.
330 INPUT \'Character ? ';a$;
340 a=CODE(a$)
350 IF a<32 OR a>127 THEN CLS:NEXT
loop
360 PRINT ' Character code=';a
370 pos=base+11+(a-32)*9
380 DIM grid(9,8)
390 FOR a=pos TO pos+8
400 a1=PEEK(a)
410 FOR b=7 TO 0 STEP -1
420 IF (a1&&(2^b))<>0 THEN
430 grid(a-pos+1,8-b)=1
440 PAPER 0
450 ELSE
460 PAPER 7
470 END IF
480 PRINT '(sp)';
490 END FOR b
500 PRINT
510 END FOR a
520 x=1:y=1
530 PAPER 4
540 AT 7,10
550 PRINT 'Keys:-'
560 AT 9,10
570 PRINT 'Cursors to move.'
580 AT 10,10
590 PRINT 'Space toggles.'
600 AT 11,10
610 PRINT '<<ESC>> when finished.'
620 REPeat lop
630 AT 6+y,x-1
640 PAPER 7*(1-grid(y,x))
650 PRINT '(sp)'
660 IF KEYROW(1)&&2 AND x>1:x=x-1
670 IF KEYROW(1)&&4 AND y>1:y=y-1
680 IF KEYROW(1)&&16 AND x<8:x=x+1
690 IF KEYROW(1)&&128 AND y<9:y=y+1
700 IF KEYROW(1)&&8 THEN EXIT lop
710 IF KEYROW(1)&&64 THEN grid(y,x)
=1-grid(y,x)
720 AT 6+y,x-1
730 INK 4
740 PRINT '*'
750 INK 0
760 END REPeat lop
770 AT 16,0
780 DIM num(9)
790 FOR qwe=1 TO 9
800 FOR qw=1 TO 8
810 IF grid(qwe,qw)=1 THEN num(qwe)
=num(qwe)+2^(8-qw)
820 END FOR qw
830 POKE pos-1+qwe,num(qwe)
840 END FOR qwe
850 PAPER 4
860 INK 0
870 INPUT 'Continue ? [y/n] ';ans$
880 IF 'n'INSTR ans$ THEN EXIT loop
890 END REPeat loop
900 CLS
910 PRINT 'To save type:-'
920 PRINT 'SBYTES mdv1_filename,base,
1000:udg <<ENTER>>'
930 PRINT
940 PRINT 'To load type:-'
950 PRINT 'LBYTES mdv1_filename,
base:udg <<ENTER>>'
960 END DEFine
970 :
980 DEFine PROCedure instructions
990 OPEN #2,con_448x190a32x16_128
1000 PAPER #2,0
1010 PAPER #0,0
1020 PAPER 0
1030 MODE 4
1040 INK 2
1050 PRINT 'UDG'\'By Bagnell.'
1060 INK 4
1070 PRINT \' This program redefines
the QL character set ( space
to copyright only ).'
1080 PRINT \' But there is one bug
in the ROM, that is if the
characters are going to  be used in
csizes :-'\\,'0,0'\,'0,2'
\,'1,0 or 1,2'
1090 PRINT \'then the first and the
last 2 squares on each row must
not be used. This  does not apply
when the other sizes are used.'
1100 PRINT \'
Also only nine of the rows on the
character are programable , the
top oneis not. The program only
displays the programable lines.'
1110 PRINT
1120 INK 2
1130 PRINT 'PRESS ANY KEY TO START'
1140 PAUSE
1150 END DEFine
```

## Listing two

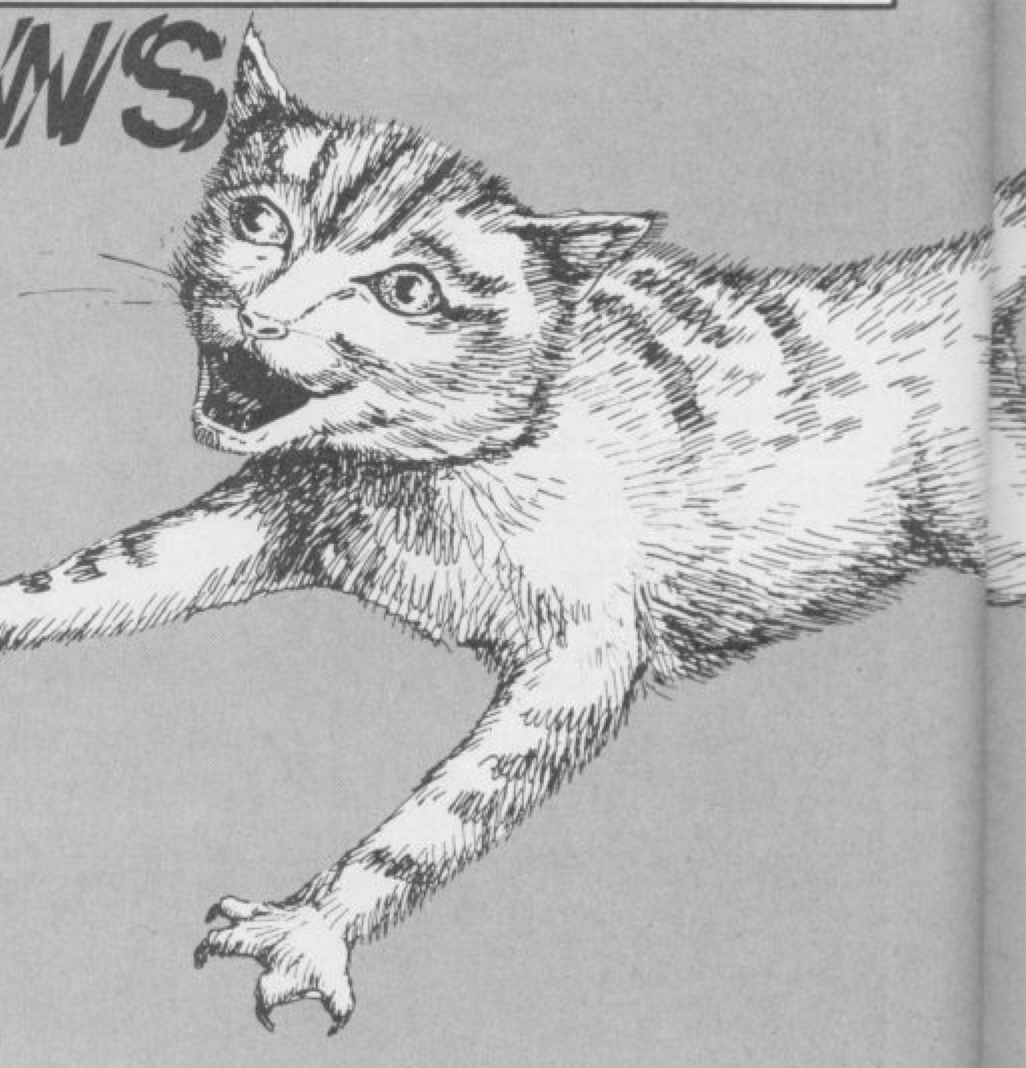
```
32000 DEFine PROCedure udg
32010 LOCal base,a$
32020 base=RESPR(1024)
32030 INPUT#0;'Filename in
format :-  mdv1_filename ';a$
32040 LBYTES a$,base
32050 POKE_L 262126,base
32060 start_char_set
32070 END DEFine
32080 :
32090 DEFine PROCedure start_char_set
32100 LOCal base
32110 base=PEEK_L(262126)
32120 POKE_L 167722,base
32130 END DEFine
```

Gobble up the mice but watch out for the much more dangerous rats in **Paws** by Terry Braverman of Cambridge for the 48K Spectrum. Luckily you play the part of a particularly gruesome moggie with poisonous spit just right for dealing with the rats.

**Paws** was an entry in the 1984 Cambridge Awards competition and is compatible with the Kempston joystick interface. Full instructions are given in the program.

*Paws uses our special abbreviations for graphics characters, so please read the instructions on the first page of Program Printout before entering the listing.*

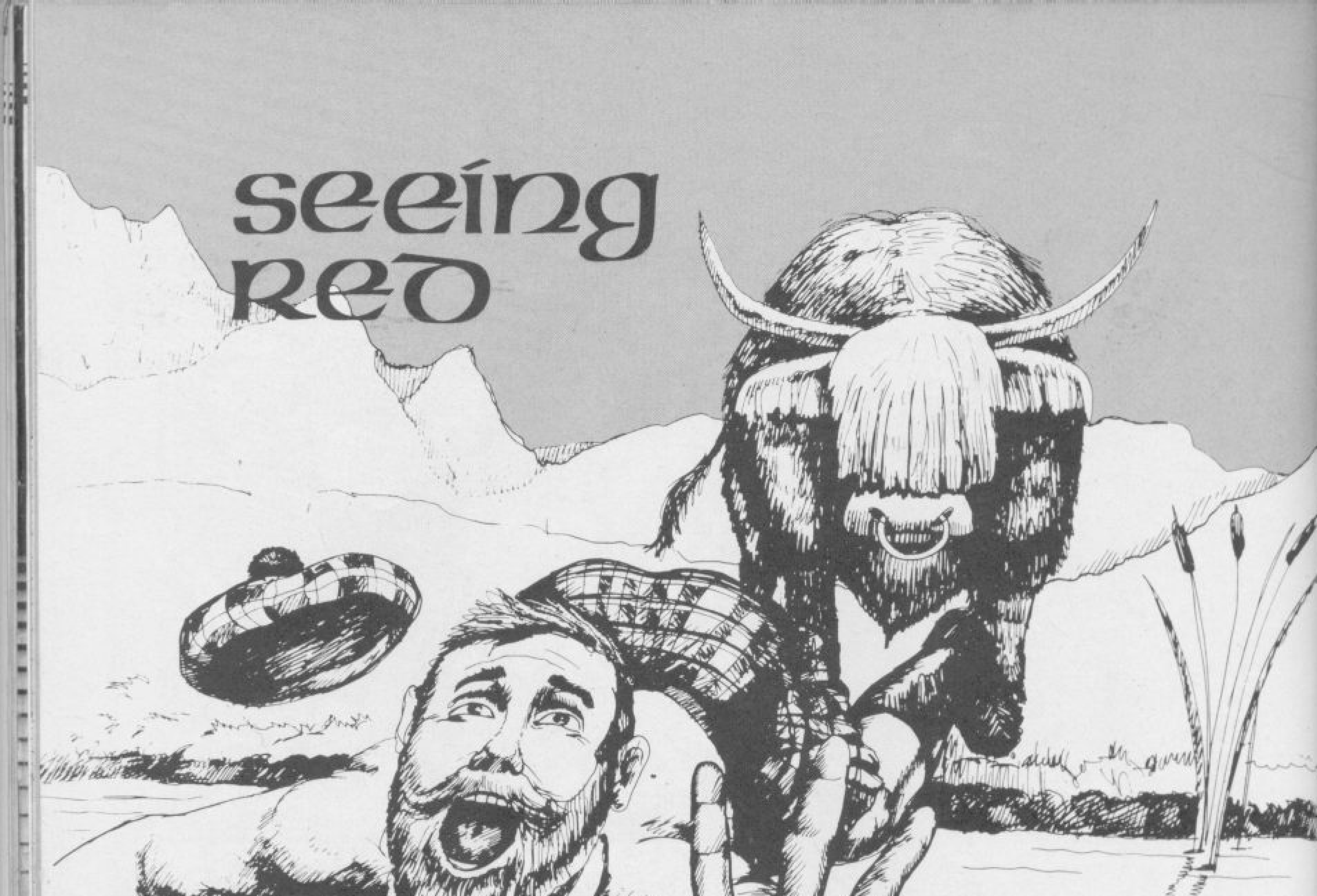
# PAWS



```
   1 RESTORE : FOR m=0 TO 7: REA
D a: POKE USR "A"+m,a: NEXT m: F
OR r=0 TO 7: READ b: POKE USR "C
"+r,b: NEXT r: FOR d=0 TO 7: REA
D c: POKE USR "B"+d,c: NEXT d: F
OR z=0 TO 7: READ d: POKE USR "D
"+z,d: NEXT z
   2 DATA 0,36,24,24,60,60,126,0
,33,114,122,25,249,58,218,188,35
,225,225,51,63,62,33,66,196,135,
135,204,252,188,132,66
   3 CLS
   4 LET bt=100000: LET bs=0
   5  BORDER 7: PAPER 7: INK 1:
CLS : PRINT AT 0,0;"This game ha
s been produced for Kempston Joy
stick (8 positions)/Keyboard Con
trol  (using  the  4arrow keys).
 The  cat can spit adeadly  pois
onous  venom .......": BRIGHT 1;
"Press buttons on Joystick or ..
.Press '0' key on Keyboard.
 ": BRIGHT 0: PRINT  INK 2;AT 11
,0;"There is an on-screen timer
 andboth time and score are show
n atthe end of each game. If you
 cansuccessfully  complete the g
ame,the "; BRIGHT 1;TAB 4;"'best
 time'"; BRIGHT 0;TAB 16;"and ";
 BRIGHT 1;TAB 20;"'best score'";
 BRIGHT 0;"(since loading) are d
isplayed.": PAUSE 750
   6 PRINT  INK 0;AT 21,0;"More
instructions follow shortly": PA
USE 500: CLS
   7 PRINT  INK 2;"MICE = 1 POIN
T : RATS = 2 POINTS";AT 3,0; BRI
GHT 1;"THE CAT  CAN ONLY DESTROY
 A RAT  WHEN IT IS MOVING TO THE
 LEFT  ": BRIGHT 0: PAUSE 400: P
RINT  INK 3;AT 8,0;"Your overall
 objective is to EATall the MICE
 and to  DESTROY allthe RATS  as
 QUICKLY as you can.": PRINT : P
RINT  INK 2;"           TAKE CARE
!": PAUSE 500: PRINT AT 15,0; IN
K 1;"A  simpler  version might b
e to see how quickly you can  ea
t allthe MICE while avoiding the
 RATS": PRINT : PRINT  INK 2;AT
19,7;"BEWARE AT LEVEL 3!"; INK 4
;AT 21,9;"Happy Hunting!": PAUSE
 750: CLS
   8 PRINT AT 4,0;"Select  diffi
culty   1    2   3 ";AT 10,8;"1.
  Easy";AT 12,8;"2.   Tricky";A
T 14,8;"3.   Difficult": PAUSE 0
: IF INKEY$="1" THEN  LET w=1
   9 IF INKEY$="2" THEN  LET w=2
  10 IF INKEY$="3" THEN  LET w=3
  11 CLS : PAPER 3: BORDER 3: CL
S : PRINT  INK 7;AT 9,3;"  Press
 'j' for joystick ";AT 14,3;"  P
ress 'k' for keyboard": PAUSE 0
  12 IF INKEY$="j" THEN  LET zz=
2500: GO TO 15
  13 IF INKEY$="k" THEN  LET zz=
155: GO TO 15
  14 GO TO 11
  15 RESTORE
  17 PRINT  FLASH 1; INK 6;AT 3,
2;"Do you want instructions? y/n
";AT 20,27; FLASH 0: PAUSE 0: IF
 INKEY$="y" OR INKEY$="Y" THEN
GO TO 20
  18 IF INKEY$="n" OR INKEY$="N"
 THEN  GO TO 30
  19 GO TO 17
  20 PAPER 7: BORDER 7: CLS : PR
INT  INK 2;AT 0,2; FLASH 1;"PRES
S 'q' TO STOP GAME": GO SUB 9997
  21 PRINT  INK 1;AT 2,2;"There
are fifty mice....their   positi
ons  change  with  each   new  g
ame.  The  CAT  has  to  EAT al
l the mice.": PAUSE 100: PRINT
INK 1;AT 21,2; INK 3; BRIGHT 1;"
AAAAAAAAA": PAUSE 200: PRINT AT
 21,2; PAPER 7; INK 3; BRIGHT 0;
"AAAAAAAAA"
  22 PRINT  INK 3;AT 7,2;"There
are also four rats ...to  begin
with ....their positions  change
 with each new game.": PAUSE 100
: PRINT  INK 3;AT 21,15; PAPER 6
; INK 2; BRIGHT 1;"C(sp)C(sp)C(s
p)C": PAUSE 200: PRINT AT 21,15;
 PAPER 6; INK 2; BRIGHT 0;"C(sp)
C(sp)C(sp)C"
  23 PRINT  INK 2;AT 11,2;"BUT
EVERY  TIME  A  MOUSE  IS  EATEN
,  MORE    RATS    APPEAR!": GO S
UB 9997
  24 PRINT  INK 0;AT 15,2;"WARNI
NG!!!     CAT.....BEWARE!  IF YO
U TRY TO CATCH A RAT.....     TH
E RAT WILL EAT YOU!": PRINT  OVE
R 1; INK 0;AT 16,2;"____________
____________(9*sp)______________
_______": OVER 0: PRINT AT 21,27
; INK 0; BRIGHT 1;"D(sp)B": GO S
UB 9997: PAUSE 250: PRINT AT 21,
27; BRIGHT 0;"D(sp)B"
  26 PAPER 7: BORDER 7: CLS : PR
INT ; FLASH 1; INK 0;AT 4,1;"CAT
 IS IN TOP LEFT HAND CORNER";AT
0,0;"B"; INK 0;AT 10,10;"GET REA
DY": PAUSE 350: FLASH 0: CLS
  30 PAPER 7: BORDER 7: CLS : FO
R a=0 TO 21: PRINT  INK 1;AT a,0
;"(ig8)": NEXT a
  35 FOR b=0 TO 31: PRINT  INK 1
;AT 21,b;"(sp)": NEXT b
  40 FOR c=21 TO 0 STEP -1: PRIN
T  INK 1;AT c,31;"(sp)": NEXT c
  45 FOR d=31 TO 0 STEP -1: PRIN
T  INK 1;AT 0,d;"(sp)": NEXT d
  46 FOR a=0 TO 21: PRINT  PAPER
 4; INK 1; OVER 1;AT a,0;"*": NE
XT a: FOR c=21 TO 0 STEP -1: PRI
NT  PAPER 4; INK 1; OVER 1;AT c,
31;"*": NEXT c
  47 RESTORE 47: FOR a=1 TO 10:
READ b,c: PRINT  PAPER 4; INK 1;
 OVER 1;AT 0,b;"*";AT 21,c;"*":
NEXT a
  49 DATA 24,1,25,2,26,3,27,4,28
,5,29,26,30,27,1,28,7,29,8,30
  55 PRINT  INK 8; OVER 1;AT 0,1
0;"CAT 'n' MOUSE";AT 21,7;"(2*sp
)T.Braverman(5*sp)": GO SUB 9997
  60 FOR n=1 TO 50
  65 LET e=2+INT (RND*18): LET f
=2+INT (RND*28)
  70 IF ATTR (e,f)=59 THEN  GO T
O 65
  80 PAPER 7: PRINT  INK 3;AT e,
f;"A"
  85 NEXT n
  98 FOR o=1 TO 4
 100 LET g=2+INT (RND*18): LET h
=2+INT (RND*28)
 105 IF ATTR (g,h)=59 THEN  GO T
O 100
 108 IF ATTR (g,h)=50 THEN  GO T
O 100
 110 PAPER 7: PRINT  PAPER 6; IN
K 2;AT g,h;"C": NEXT o
 130 LET s=0: LET ss=0
 140 LET x=1: LET y=1
 150 POKE 23672,0: POKE 23673,0
 155 PAPER 7: PRINT  INK 0;AT x,
y;"B"
 160 IF INKEY$="8" THEN  PRINT
PAPER 7; INK 0;AT x,y;"D"
 165 IF zz=2500 THEN  GO TO 2500
 166 IF INKEY$="" THEN  BEEP .04
,-25: GO TO 243
 170 LET lx=x: LET ly=y
 180 IF INKEY$="q" THEN  GO TO 9
999
 181 IF INKEY$="0" AND ATTR (x,y
-1)=50 THEN  PRINT  FLASH 1; INK
```



```
 2;AT x,y-1;"*": FOR n=0 TO 20:
BEEP (.25*.1),n: NEXT n: FOR n=2
0 TO 0 STEP -1: BEEP (.25*.1),n:
 NEXT n: PRINT AT x,y-1;"(sp)":
LET ss=ss+2
 186 IF INKEY$="5" THEN  LET y=y
-1: BEEP .05,-50
 191 IF INKEY$="8" THEN  LET y=y
+1: BEEP .05,-50
 196 IF INKEY$="6" THEN  LET x=x
+1: BEEP .05,-50
 201 IF INKEY$="7" THEN  LET x=x
-1: BEEP .05,-50
 203 PRINT AT lx,ly;"(sp)"
 210 IF x<1 OR x>20 THEN  LET x=
lx
 215 IF y<1 OR y>30 THEN  LET y=
ly
 225 IF ATTR (x,y)=59 THEN  LET
s=s+1: BEEP .025,30: BEEP .025,1
2: GO TO 9980
 232 LET ab=0: IF s=50 THEN  CLS
 : GO TO 400
 240 IF ATTR (x,y)=50 THEN  PRIN
T AT x,y; FLASH 1;"C": LET b=.02
5: FOR t=1 TO 20: BEEP b,24: BEE
P b,20: BEEP b,17: BEEP b,12: NE
XT t: PRINT  INK 0;AT x,y; FLASH
 0;"C": GO TO 450
 243 LET t=(PEEK 23672+256*PEEK
23673)/50
 244 PRINT  INK 2;AT 0,2;t
 245 GO TO 155
 405 PRINT TAB 8; INK 2;"Score =
  ";s+ss;AT 3,8;t;" seconds ":
GO SUB 9997: PAUSE 75
 406 IF t<bt THEN  LET bt=t: PRI
NT  INK 4;AT 6,4;"BEST TIME ";bt
;" SECONDS";AT 9,7;"CONGRATULATI
ONS!": GO SUB 9997
 407 IF t>bt THEN  PRINT  INK 4;
AT 6,4;"BEST TIME ";bt;" SECONDS
";AT 9,1;"SLOWCOACH! I'M SURPRIS
ED YOU          CATCH ANYTHING!
": PRINT  OVER 1;AT 10,14;"_____
___": GO SUB 9997
 410 IF s+ss>bs THEN  LET bs=s+s
s: PRINT  INK 2;AT 19,7;"Best sc
ore is ";bs
 412 IF s+ss=50 OR s+ss<bs THEN
 PRINT  INK 2;AT 12,0;"Can't you
do better? Try again!"
 413 PRINT AT 19,7;"Best score i
s ";bs
 414 PRINT AT 21,0;"MAXIMUM: Lev
el 1:156 2:352 3:450": PAUSE 150
 416 PRINT  INK 1; FLASH 1;AT 15
,1;"Do you want to play again? y
/n": PAUSE 0: IF INKEY$="y" OR I
NKEY$="Y" THEN  FLASH 0: GO TO 3
000
 418 IF INKEY$="n" OR INKEY$="N"
 THEN  FLASH 0: GO TO 9999
 420 GO TO 408
 450 PRINT  INK 2;AT 8,1;"CATast
rophe! Eaten by THE RAT!";AT 10,
7; FLASH 1;"Your score is ";s+ss
: GO SUB 9997: FLASH 0
 455 PAUSE 150
 460 PRINT  INK 2; FLASH 1;AT 12
,1;"Do you want to play again? y
/n"
 465 IF INKEY$="y" OR INKEY$="Y"
 THEN  FLASH 0: GO TO 3000
 467 IF INKEY$="n" OR INKEY$="N"
 THEN  FLASH 0: GO TO 9999
 468 GO TO 460
 470 IF a$="y" THEN  GO TO 10
 475 CLS : GO TO 9999
2500 PRINT  PAPER 7: PRINT  INK
0;AT x,y;"B"
2502 IF IN 31=1 THEN  PRINT  PAP
ER 7; INK 0;AT x,y;"D"
2505 IF IN 31=0 THEN  BEEP .04,-
25: GO TO 243
2510 LET lx=x: LET ly=y
2520 IF IN 31=2 THEN  LET y=y-1:
 BEEP .05,-50
2521 IF IN 31=16 AND ATTR (x,y-1
)=50 THEN  PRINT  INK 2; FLASH 1
;AT x,y-1;"*": FOR n=0 TO 20: BE
EP (.25*.1),n: NEXT n: FOR n=20
TO 0 STEP -1: BEEP (.25*.1),n: N
EXT n: PRINT AT x,y-1;"(sp)": LE
T ss=ss+2
2525 IF IN 31=1 THEN  LET y=y+1:
 BEEP .05,-50
2530 IF IN 31=4 THEN  LET x=x+1:
 BEEP .05,-50
2531 IF IN 31=10 THEN  LET x=x-1
: LET y=y-1: BEEP .05,-15
2532 IF IN 31=6 THEN  LET x=x+1:
 LET y=y-1: BEEP .05,-15
2533 IF IN 31=9 THEN  LET x=x-1:
 LET y=y+1: BEEP .05,-15
2534 IF IN 31=5 THEN  LET x=x+1:
 LET y=y+1: BEEP .05,-15
2535 IF IN 31=8 THEN  LET x=x-1:
 BEEP .05,-50
2537 PRINT AT lx,ly;"(sp)"
2540 IF x<1 OR x>20 THEN  LET x=
lx
2545 IF y<1 OR y>30 THEN  LET y=
ly
2550 IF ATTR (x,y)=59 THEN  LET
s=s+1: BEEP .025,30: BEEP .025,1
2: GO TO 9980
2555 LET ab=0: IF s=50 THEN  CLS
 : GO TO 400
2560 IF ATTR (x,y)=50 THEN  PRIN
T AT x,y; FLASH 1;"C": LET b=.02
5: FOR t=1 TO 20: BEEP b,24: BEE
P b,20: BEEP b,17: BEEP b,12: NE
XT t: PRINT  INK 0;AT x,y; FLASH
 0;"C": GO TO 450
2565 LET t=(PEEK 23672+256*PEEK
23673)/50
2570 PRINT  INK 2;AT 0,2;t
2573 IF IN 31=1 THEN  GO TO 160
2575 GO TO 155
3000 RESTORE
3005 CLS : GO TO 8
9980 LET i=2+INT (RND*18): LET j
=2+INT (RND*28)
9981 LET ab=ab+1: IF ATTR (i,j)<
>57 THEN  GO TO 9980
9982 PRINT  PAPER 6; INK 2;AT i,
j;"C"
9983 IF w=2 AND ab=1 THEN  GO TO
 9980
9984 IF w=2 AND ab=2 THEN  GO TO
 9980
9986 IF w=3 AND ab=1 THEN  GO TO
 9980
9990 IF w=3 AND ab=2 THEN  GO TO
 9980
9991 IF w=3 AND ab=3 THEN  GO TO
 9980
9996 GO TO 232
9997 BEEP .25,0: BEEP .25,5: BEE
P .25,0: BEEP .25,-3: BEEP .25,0
: BEEP .25,5: BEEP .25,0: BEEP .
25,-3: BEEP .25,0: BEEP .25,5: B
EEP .25,9: BEEP .25,7: BEEP .25,
5: BEEP .5,7: RETURN
9999 NEW
```



# Seeing Red

WHAT do Scottish men wear under their kilts? The bull knows and it is seeing red in this game for the 16K Spectrum. The author, C C Stock of Chelmsford, puts you in the role of the bull taking it out on the farmer.

*This program uses a graphics notation explained at the start of Program Printout.*

*more programs on page 93*

```
   5 REM  INTRODUCTION
  10 PAPER 4: BORDER 4: CLS
  12 PAPER 1: INK 6: PRINT AT 7,
4;" R A G I N G   B U L L "
  14 INK 0: PAPER 4: PRINT AT 11
,0;"  There you were, enjoying a
    sunny afternoon with plenty
of  female company, when along c
omesthe farmer and takes them al
l   away!!   You can't allow tha
t.       Push the farmer into the
     stream using curser keys 6
& 7 "
  15 GO SUB 1000
  20 LET ls=9999
  50 PAPER 4: INK 1: PRINT AT 20
,8;" Press any key "
  60 IF INKEY$="" THEN  GO TO 60
  62 REM  SCREEN
  65 CLS
  70 FOR n=0 TO 21
  80 PRINT AT n,0; INK 5;"(2*isp
)";AT n,29;"(2*isp)"
  90 NEXT n
  95 LET a$=")))))))))))))))))))
)))))))))": PRINT AT 0,2;a$;AT 21
,2;a$
 100 LET m1=-1: LET b1=2: LET j=
5: LET a=15: LET p=1: LET b=0: L
ET m=15: LET s=0
 120 REM  MAIN LOOP
 125 REM  FARMER
 130 LET j1=j: LET j=j+INT (RND*
3-1)
 140 IF j<1 THEN  LET j=2
 150 IF j>20 THEN  LET j=19
 160 INK 2: PRINT AT j1,m;"(sp)"
: IF p>0 THEN  PRINT AT j,m;"A":
 GO TO 170
 165 PRINT AT j,m;"L"
 170 INK 1: LET s=s+1: LET a1=a
 298 REM  BULL
 300 BEEP .005,-8: BEEP .005,-6
 310 LET a=a+(INKEY$="6")-(INKEY
$="7")
 320 LET a=a+(a<1)-(a>20)
 322 PRINT AT a1,b1;"(2*sp)"
 325 IF ABS p=2 THEN  GO TO 340
 330 LET b=b+2: IF p=1 THEN  PRI
NT AT a,b;"HI": GO TO 350
 335 PRINT AT a,b;"JK": GO TO 35
0
 340 LET b=b-2: IF p=2 THEN  PRI
NT AT a,b;"DE": GO TO 350
 345 PRINT AT a,b;"FG"
 350 LET b1=b: IF a=j THEN  IF b
=m-1 OR b=m THEN  GO TO 800
 360 LET p=-p: IF b=26 THEN  LET
 b=29: LET p=2: LET m1=-1
 380 IF b=3 THEN  LET b=0: LET p
=1: LET m1=1
 385 GO TO 120
 798 REM  RAM FARMER
 800 LET m=m+m1: PRINT AT j,m; P
APER 6; INK 2;"A"
 820 BEEP 1,0: BEEP .5,8
 825 PRINT AT j,m;"(sp)"
 827 LET m=m+m1: IF m<2 OR m>27
THEN  GO TO 910
 830 GO TO 360
 900 REM  FARMER IN DITCH
 910 PAPER 2: INK 6: FLASH 1: PR
INT AT 8,7;"  YOU GOT HIM!!   "
 920 FLASH 0:  PRINT AT 10,6;"
 SCORE =           ";AT 10,18;s
 930 FOR b=1 TO 16
 935 PAPER 5: INK 2: PRINT AT j,
m;"C"
 940 LET a=INT (RND*12+RND*12)
 950 BEEP .1,a: PRINT AT j,m;"
": BEEP .1,a: NEXT b
 965 IF s<ls THEN  LET ls=s
 970 PRINT AT 12,5;" LOWEST SCOR
E =       ";AT 12,22;ls
 980 GO TO 50
 998 REM  GRAPHICS
1000 FOR n=0 TO 95: READ x: POKE
 USR "A"+n,x: NEXT n: RETURN
1010 DATA 60,24,126,126,189,189,
100,4
1020 DATA 0,0,129,189,219,126,60
,60
1030 DATA 0,0,60,24,126,255,189,
189
1040 DATA 243,95,255,255,103,13,
24,16,224,248,254,251,249,236,6,
2
1050 DATA 243,95,255,255,103,6,3
,1,224,248,254,251,249,24,48,32
1060 DATA 7,31,127,223,159,55,96
,64,207,250,255,255,230,176,24,8
1070 DATA 7,31,127,223,159,24,12
,4,207,250,255,255,230,96,192,12
8
1080 DATA 60,153,189,255,60,60,3
8,32
```



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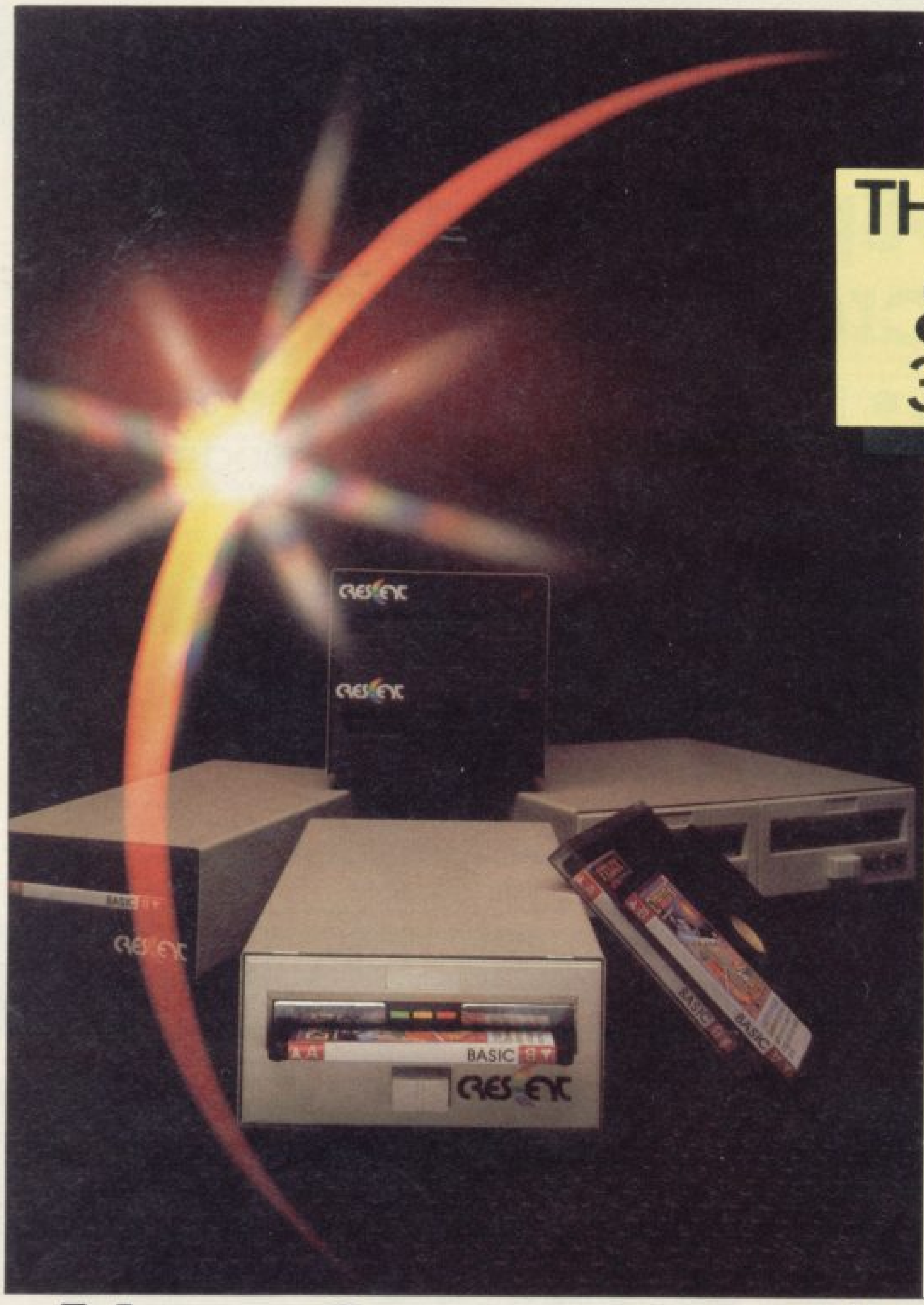
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- Exclusive low cost accessories through INNER CIRCLE CLUB
- One-touch disk load/unload
- Compact and lightweight
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- Full manual provided

†See address below for details.

# New Crescent 3″ disk drive upgrade for Spectrum.

## SPECIFICATION OF DFS

- Handles up to 78 files (200K) on 3″ diskette (39 files per side)
- Interface uses 8K of user RAM. However, the manual contains a machine code program which allows 48K programs to be loaded and saved
- Has extension edge connector to allow plug in peripherals like printers and joysticks
- Random access filing of data arrays
- Has additional BASIC commands
- Will support 3″, 3½″ or 5¼″ drives
- Black livery to match SPECTRUM

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| CRESCENT POWER SUPPLY | £29.95* |

The CRESCENT 200S combines the CRESCENT 401 3″ drive with the CRESCENT 200 DFS.

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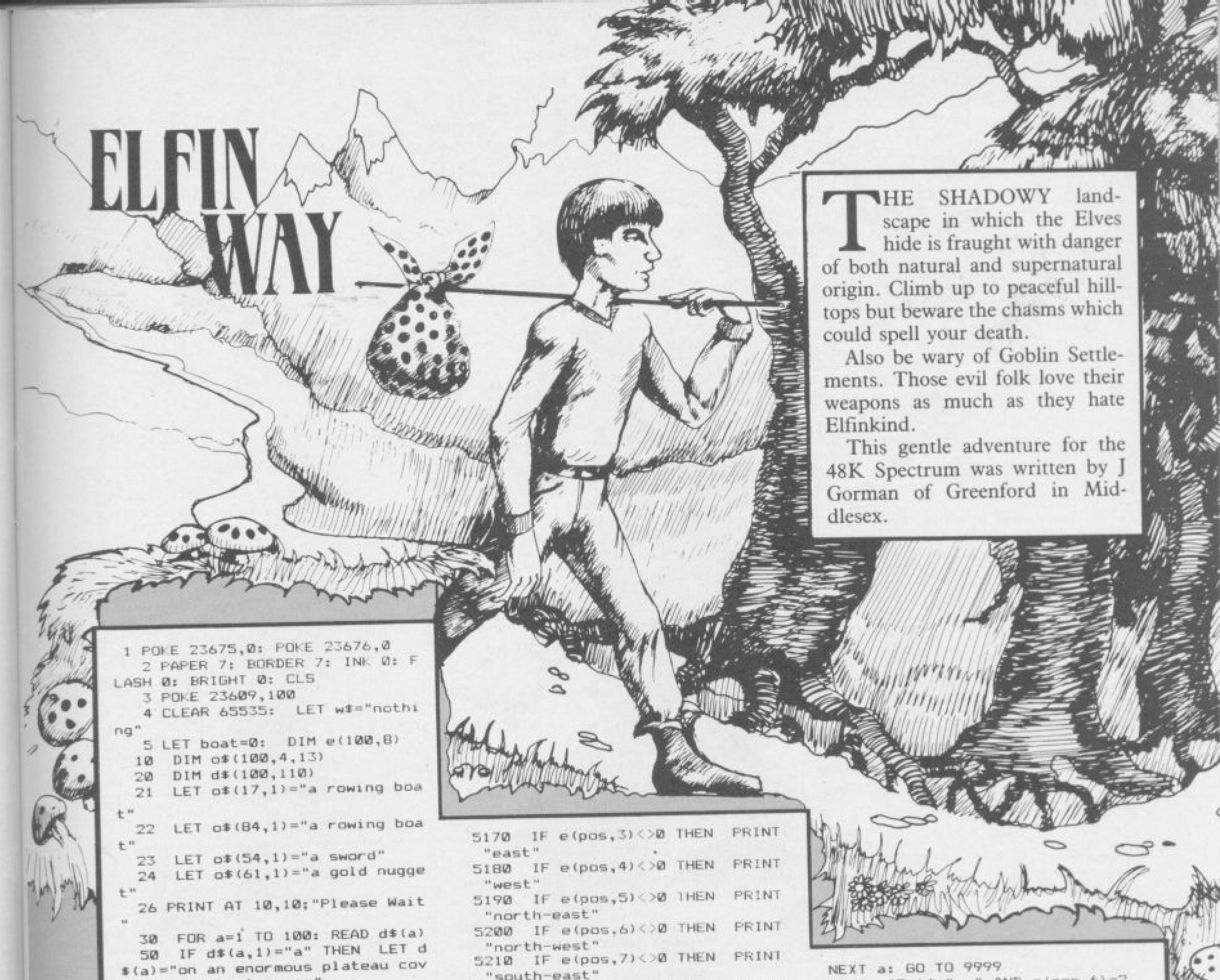
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# ELFIN WAY

THE SHADOWY landscape in which the Elves hide is fraught with danger of both natural and supernatural origin. Climb up to peaceful hilltops but beware the chasms which could spell your death.

Also be wary of Goblin Settlements. Those evil folk love their weapons as much as they hate Elfinkind.

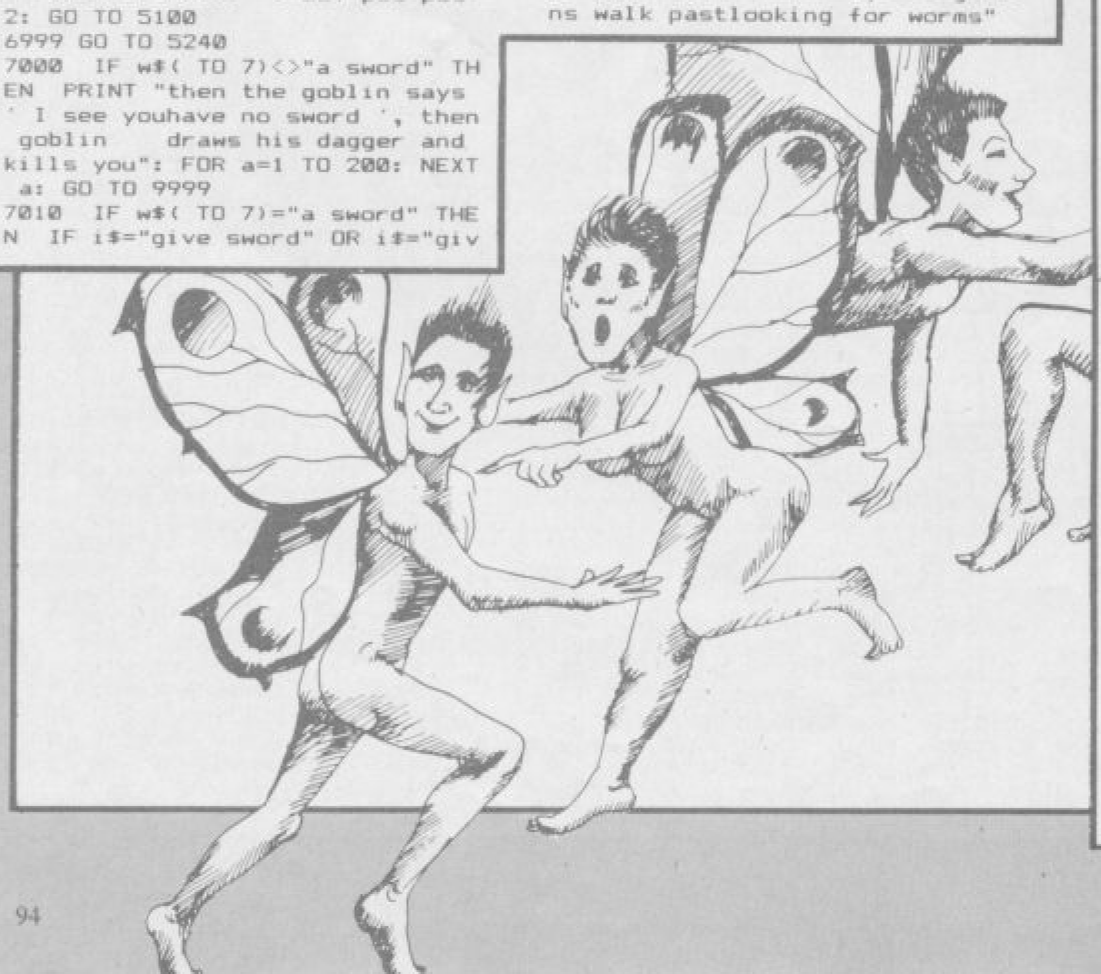
This gentle adventure for the 48K Spectrum was written by J Gorman of Greenford in Middlesex.

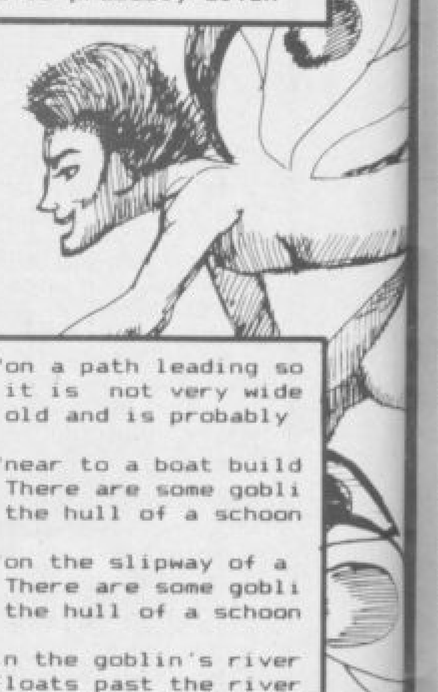
```
 1 POKE 23675,0: POKE 23676,0
   2 PAPER 7: BORDER 7: INK 0: F
LASH 0: BRIGHT 0: CLS
   3 POKE 23609,100
   4 CLEAR 65535:  LET w$="nothi
ng"
   5 LET boat=0:  DIM e(100,8)
  10  DIM o$(100,4,13)
  20  DIM d$(100,110)
  21  LET o$(17,1)="a rowing boa
t"
  22  LET o$(84,1)="a rowing boa
t"
  23  LET o$(54,1)="a sword"
  24  LET o$(61,1)="a gold nugge
t"
  26 PRINT AT 10,10;"Please Wait
"
  30  FOR a=1 TO 100: READ d$(a)
  50  IF d$(a,1)="a" THEN  LET d
$(a)="on an enormous plateau cov
ered  in short grass"
  51 IF d$(a,1)="b" THEN  LET d$
(a)= "on the edge of the plateau
,belowthere is a long shear drop
 east,south east & south"
  52  IF d$(a,1)="c" THEN  LET d
$(a)="on top of a fortified emba
nkmentit is impossible to get ov
er but you can see the great mou
ntains"
  53  IF d$(a,1)="d" THEN  LET d
$(a)="in a giant lake you can se
e an  island on the horizón"
  70 NEXT a:  FOR a=1 TO 100
  80  FOR b=1 TO 8: READ e(a,b)
 100  NEXT b: NEXT a: LET pos=1
 110 CLS
5120  PRINT ''"you are:"'d$(pos)
5130 IF o$(pos,1,1)<>"(sp)" THEN
   PRINT "you can see:"': FOR a=
1 TO 5: PRINT o$(pos,a): IF o$(p
os,a,1)="(sp)" THEN  GO TO 5137
5135  NEXT a
5137  IF boat=0 THEN  IF pos=10
OR pos=19 OR pos=28 OR pos=38 OR
 pos=49 OR pos=59 OR pos=77 OR p
os=85 OR pos=86 OR pos=87 OR pos
=88 OR pos=89 OR pos=94 OR pos=9
5 OR pos=96 OR pos=98 OR pos=99
OR pos=100 THEN  PRINT "you are
englulfed by the water  and drow
n": FOR a=1 TO 500: NEXT a: GO T
O 9999
5138  IF pos=97 THEN  GO TO 9900
5139  IF boat=1 THEN  PRINT '"yo
u are in the boat"
5140  PRINT "exits:"
5150  IF e(pos,1)<>0 THEN  PRINT
 "north"
5160  IF e(pos,2)<>0 THEN  PRINT
 "south"
5170  IF e(pos,3)<>0 THEN  PRINT
 "east"
5180  IF e(pos,4)<>0 THEN  PRINT
 "west"
5190  IF e(pos,5)<>0 THEN  PRINT
 "north-east"
5200  IF e(pos,6)<>0 THEN  PRINT
 "north-west"
5210  IF e(pos,7)<>0 THEN  PRINT
 "south-east"
5220  IF e(pos,8)<>0 THEN  PRINT
 "south-west"
5240 PRINT ':  FOR a=0 TO 31: PR
INT "-";: NEXT a: PRINT '
5270  INPUT  LINE i$: IF i$="" T
HEN  GO TO 5270
5272 IF i$="i" THEN  PRINT '"you
 are carrying ";w$: GO TO 5240
5273 IF LEN i$>5 THEN   IF i$( T
O 6)="get in" THEN  GO TO 6500
5274 IF LEN i$>6 THEN   IF i$( T
O 7)="get out" THEN  GO TO 6550
5275  PRINT i$'
5276  IF pos=72 THEN  GO TO 7000
5277 IF LEN i$>7 THEN  IF i$( TO
 8)="push off" THEN  GO TO 6600
5278  IF i$="n" AND e(pos,1)=2 T
HEN  PRINT '"you fall down a ste
ep cliff &   smash your skull .
You are dead": FOR a=1 TO 500: N
EXT a: GO TO 9999
5279  IF i$="s" AND e(pos,2)=2 T
HEN  PRINT '"you fall down a ste
ep cliff &   smash your skull .
You are dead": FOR a=1 TO 500: N
EXT a: GO TO 9999
5280  IF i$="e" AND e(pos,3)=2 T
HEN  PRINT '"you fall down a ste
ep cliff &   smash your skull .
You are dead": FOR a=1 TO 500: N
EXT a: GO TO 9999
5281  IF i$="w" AND e(pos,4)=2 T
HEN  PRINT '"you fall down a ste
ep cliff &   smash your skull .
You are dead": FOR a=1 TO 500: N
EXT a: GO TO 9999
5282  IF i$="ne" AND e(pos,5)=2
THEN  PRINT '"you fall down a st
eep cliff &   smash your skull .
 You are dead": FOR a=1 TO 500:
NEXT a: GO TO 9999
5283  IF i$="nw" AND e(pos,6)=2
THEN  PRINT '"you fall down a st
eep cliff &   smash your skull .
 You are dead": FOR a=1 TO 500:
NEXT a: GO TO 9999
5284  IF i$="se" AND e(pos,7)=2
THEN  PRINT '"you fall down a st
eep cliff &   smash your skull .
 You are dead": FOR a=1 TO 500:
NEXT a: GO TO 9999
5285  IF i$="sw" AND e(pos,8)=2
THEN  PRINT '"you fall down a st
eep cliff &   smash your skull .
 You are dead": FOR a=1 TO 500:
NEXT a: GO TO 9999
5286  IF pos=77 THEN  LET pos=76
: LET boat=0: GO TO 5100
5289  IF i$="n" AND e(pos,1)<>0
THEN  LET pos=pos-10: GO TO 5100
5290  IF i$="s" AND e(pos,2)<>0
THEN  LET pos=pos+10: GO TO 5100
5295  IF i$="e" AND e(pos,3)=5 T
HEN  LET pos=pos+2: GO TO 5100
5300  IF i$="e" AND e(pos,3)<>0
THEN  LET pos=pos+1: GO TO 5100
5305  IF i$="w" AND e(pos,4)=5 T
HEN  LET pos=pos-2: GO TO 5100
5310  IF i$="w" AND e(pos,4)<>0
THEN  LET pos=pos-1: GO TO 5100
5320  IF i$="ne" AND e(pos,5)<>0
 THEN  LET pos=pos-9: GO TO 5100
5330  IF i$="nw" AND e(pos,6)<>0
 THEN  LET pos=pos-11: GO TO 510
0
5340  IF i$="se" AND e(pos,7)<>0
 THEN  LET pos=pos+11: GO TO 510
0
5345  IF i$="sw" AND e(pos,8)=5
THEN  LET pos=pos+18: GO TO 5100
```

*continued on page 94*

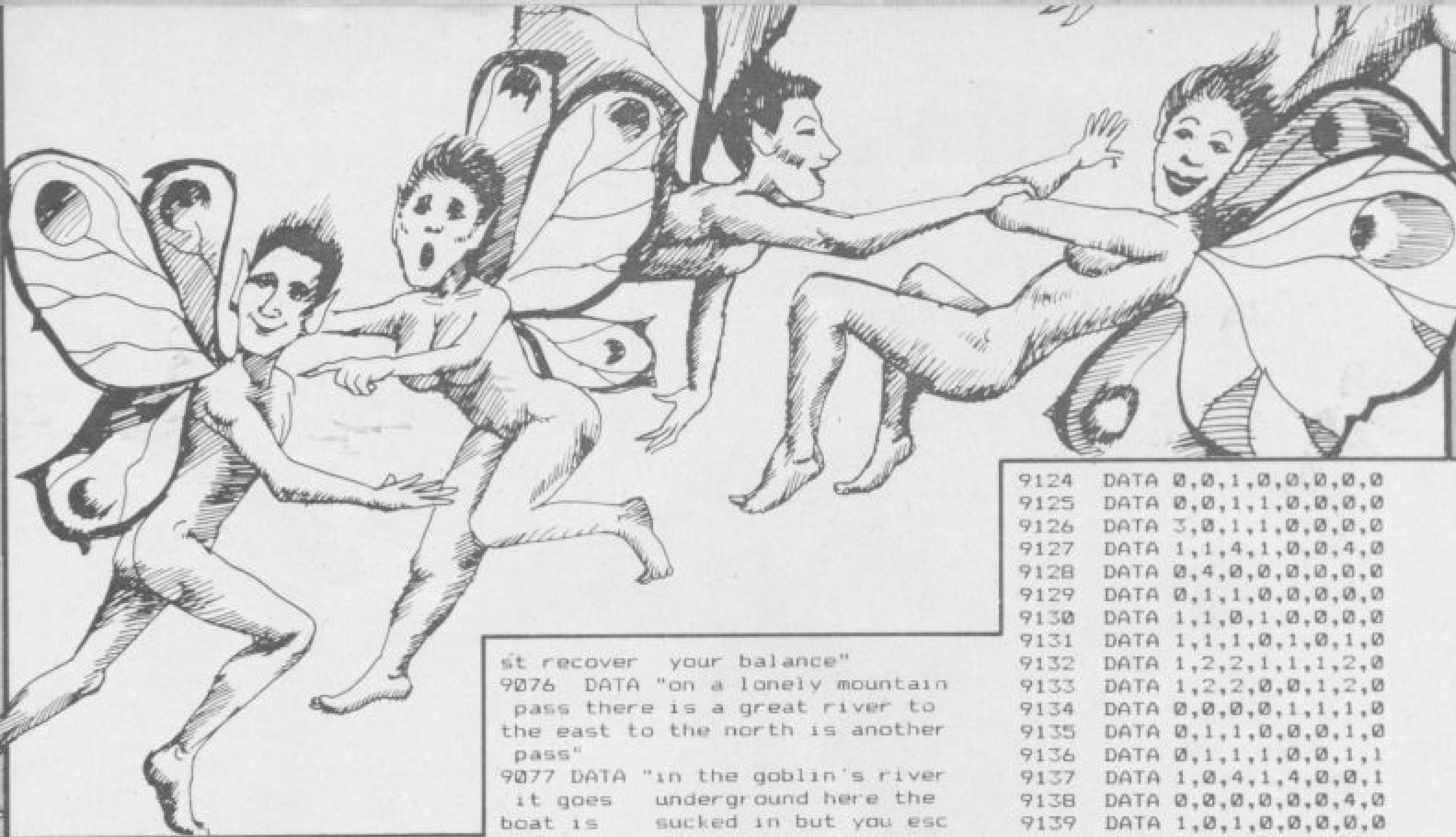
*continued on page 93*

```
5350  IF i$="sw" AND e(pos,8)<>0
 THEN  LET pos=pos+9: GO TO 5100
5351  IF i$="look" THEN  GO TO 5
100
5352  IF LEN i$>3 THEN  IF i$( T
O 4)="take" AND i$( TO 4)="take"
 THEN  GO TO 6000
5359  IF i$="n" OR i$="s" OR i$=
"e" OR i$="w" OR i$="ne" OR i$="
nw" OR i$="se" OR i$="sw" THEN
PRINT "you cannot get through th
at way": GO TO 5240
5360  PRINT "i do not understand
 you": GO TO 5240
6000  IF i$="take" THEN  PRINT "
take what?";: INPUT  LINE b$: PR
INT b$: GO TO 6130
6010  LET b$=i$(6 TO )
6030  IF b$="boat" THEN  PRINT "
it is to heavy to lift"': GO TO
5240
6040  IF b$="goblin" THEN  PRINT
 "you don't just 'take' a goblin
"'
6050  IF b$="rowing boat" THEN
PRINT "it is too heavy to lift"'
: GO TO 5240
6060  IF b$="elf" THEN  PRINT "y
ou don't know what disease you m
ight catch"': GO TO 5240
6070  IF b$="sword" THEN  FOR a=
1 TO 4: IF o$(pos,a)="a sword
   " THEN  PRINT "ok you have th
e sword"': LET g$=w$: LET w$=o$(
pos,a): LET o$(pos,a)=g$: GO TO
5240
6071  NEXT a
6072 IF b$="sword" THEN   PRINT
"I see no sword"
6080  IF b$="gold" OR b$="gold n
ugget" OR b$="nugget" THEN  FOR
a=1 TO 4: IF o$(pos,a)="a gold n
ugget" THEN  PRINT "ok you have
the gold nugget"': LET g$=w$: LE
T w$=o$(pos,a): LET o$(pos,a)=g$
: GO TO 5240
6081  NEXT a: GO TO 5240
6500  FOR a=1 TO 4: IF o$(pos,a)
="a rowing boat" THEN  PRINT '"o
k you are in the rowing boat": L
ET boat=1: PRINT ': GO TO 5240
6550  FOR a=1 TO 4: IF o$(pos,a)
="a rowing boat" AND boat=1 THEN
  PRINT '"ok you are out of the
boat": LET boat=0: PRINT ': GO T
O 5240
6551 NEXT a
6600  FOR a=1 TO 4: IF o$(pos,a)
="a rowing boat" AND boat=1 THEN
  PRINT '"the boat slips into th
e river ": PRINT ': LET pos=pos+
2: GO TO 5100
6999 GO TO 5240
7000  IF w$( TO 7)<>"a sword" TH
EN  PRINT "then the goblin says
' I see youhave no sword ', then
 goblin    draws his dagger and
kills you": FOR a=1 TO 200: NEXT
 a: GO TO 9999
7010  IF w$( TO 7)="a sword" THE
N  IF i$="give sword" OR i$="giv
e" THEN  LET w$="nothing": PRINT
 "the goblin takes the sword hid
esit in another location he come
s back and kicks you so hard tha
t you land on the tower": LET po
s=54
8000  GO TO 5100
9006  DATA '"a","a","a","a","b","
near a large hole with boiling
water bubbling out"
9007  DATA "near a large hole wi
th boiling  water bubbling out"
9008  DATA "on the banks of a sm
all stream  full of boiling wate
r  , which isflowing west"
9009  DATA "on the west bank of
the goblin'sriver southward is t
he river .  An elven ship passes
 by with a  cargo of limestone"
9010  DATA "in the goblin's rive
r .An elven ship passes by.The r
iver flows  sw"
9011  DATA "a","a","a","b"
9012 DATA "under a high cliff th
ere is an  old goblin sitting on
 a boulder"
9016  DATA "near a large hole wi
th boiling  water bubbling out"
9017  DATA "next to a small boat
-house the  door has been broken
 down to theeast is a slipway"
9018  DATA "on a small slipway t
o the south is the river"
9019  DATA "in the goblin's rive
r .An elven ship passes . The ri
ver flows   south-west"
9020  DATA "in the goblin's town
 a group of chanting goblins has
 surounded  you they are brandis
hing knives"
9023  DATA "a","b","just on the
edge of the plateau to the south
-east is a small    staircase in
 the rocks leading  down"
9024 DATA "in a small cave, a go
blin is     sleeping by the centr
al caldron which smells of elf"
9025  DATA "under a shear cliff
 face , you can see the remains
of a small  elf who must have fa
llen"
9026  DATA "on a small dried out
 mud hole   from the north comes
 the smell  of sulphur"
9027  DATA "on a small dried out
 mud hole tothe east is the rive
r"
9028 DATA "in the goblin's river
 a log-likething floats past .Th
e river nowgoes south"
9029  DATA "lying on mud-flats i
t might be  low tide , two gobli
ns walk pastlooking for worms"
9030  DATA "in the goblin's town
 a group of chanting goblins has
 surounded  you they are brandis
hing knives"
9032  DATA "b","at the bottom of
 a shear cliff  face , there are
 the remains of a small elf who
must have fallen"
9033  DATA "on the edge of the p
lateau belowthere is a long shea
r drop east,south east & south"
9034  DATA "on a path leading so
uth-east to the north-west is a
steep path  it leads to the plat
eau"
9035  DATA "in an enormous quarr
y there are goblins everywhere t
here is an  enormous hobgoblin w
ho is movinglimestone"
9036  DATA "in an enormous quarr
y there are goblins everywhere b
usy mining  limestone blocks"
9037 DATA "on a long wooden jett
y there is an elven ship moored
here some  goblins are loading i
t up"
9038 DATA "in the goblin's river
 the river flows south-east"
9039  DATA "lying on mud-flats i
t might be  low tide , two gobli
ns walk pastlooking for worms to
 eat"
9040  DATA "on a path going nort
h it is welltroden there is a tr
ail of lime-stone dust"
9043  DATA "b","b","under a shea
r cliff  face ,lyingthere are th
e remains of a fat  goblin it's
head is under a rock"
9044  DATA "next to a small wood
en fence it has a notice which r
eads 'dangerfrom falling rocks'"
9045  DATA "on a path leading ea
st ; it is  not very wide , it l
ooks old and is probably elven"
```





```
9046  DATA "on a path leading so
uth-east ;  it is  not very wide
 , it looks old and is probably
elven"
9047  DATA "near to a boat build
ing yard .  There are some gobli
ns painting the hull of a schoon
er"
9048  DATA "on the slipway of a
boat yard . There are some gobli
ns painting the hull of a schoon
er"
9049 DATA "in the goblin's river
 a goblin  floats past the river
 goes south"
9050  DATA "on a path going nort
h it is welltroden there is a tr
ail of lime-stone dust"
9051  DATA "under a cliff , abov
e , at the  top of the cliff is
a hobgoblin poised to throw a bo
ulder on you"
9052  DATA "standing on a goblin
 it wrigglesfree , gets up & hit
s you , thenit runs off to the n
orth-east"
9053  DATA "standing under an oa
k tree , to the east is a tall w
atch tower  flying the goblin's
flag"
9054  DATA "standing inside a ta
ll watch   tower , there are so
me stairs   going up to the top
of the tower"
9055  DATA "standing next to a p
ond , there is a half eaten fish
```



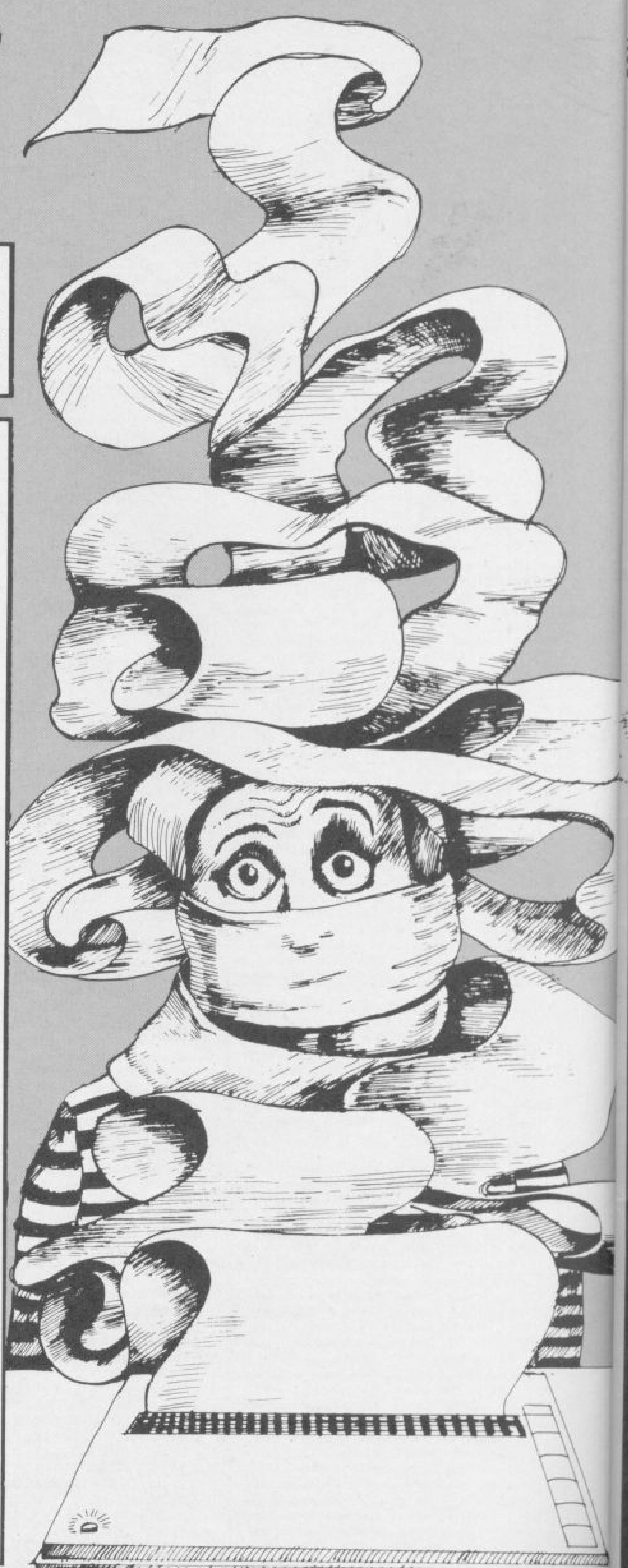
```
 floating inthe pool"
9056  DATA "in the middle of the
 goblin's  rest area , it is de
serted the  central fire is smou
ldering"
9057  DATA "on a path leading ea
st ; it is  not very wide , it l
ooks old and is probably elven"
9058  DATA "on a path leading ea
st over an  old stone bridge , i
t looks likea goblin bridge"
9059 DATA "in the river you glid
e gently   under an old stone br
idge . The river goes sw"
9060  DATA "on a path leading no
rth , to thewest is an old stone
 bridge it  goes over the river"
9061  DATA "under a great stone
archway it  is covered in gold a
nd smotheredin ivy"
9064  DATA "c","c","on a path wh
ich looks elven to  the north is
 a great watch towerflying the g
oblin's flag"
9065  DATA "in a bramble bush ,
you can see some elves picking b
lackberries they run off on seei
ng you"
9066  DATA "on a pass leading up
 into the   mountains which are
southwards"
9067  DATA "on a pass leading fr
om the old  mountains to some sm
all steppingstones leading east
across the  river"
9068  DATA "on some old stepping
 stones theylook very slippery a
nd worn"
9069  DATA "in a small oriental
garden it iswarm,to the south,so
uth east andsouth-west you can s
ee mountains"
9070  DATA "in an impassable for
rest there  are lots of vines ha
nging down  a giant stone idol i
s in front  of you"
9071  DATA "in the entrance to a
 disused    gold mine which wind
s off south-wards"
9072  DATA "in a partially flood
ed tunnel itturns east, a goblin
 jumps out  he traps you and say
s ' give me your sword '"
9073  DATA "on a lonely mountain
 pass there are loose rocks on t
he floor youslip and fall but ju
st recover your balance"
9074  DATA "on a path which look
s elven to  the east is a mounta
in pass"
9075  DATA "on a lonely mountain
 pass there are loose rocks on t
he floor youslip and fall but ju
st recover  your balance"
9076  DATA "on a lonely mountain
 pass there is a great river to
the east to the north is another
 pass"
9077 DATA "in the goblin's river
 it goes    underground here the
boat is     sucked in but you esc
ape"
9078  DATA "on a mountain pass w
hich leads  east , to the north-
east is a   garden"
9079  DATA "on a mountain pass w
hich leads  east , to the north
is a garden"
9080  DATA "on a mountain pass w
hich leads  south , to the north
-west is a  garden"
9081  DATA "in a partially flood
ed tunnel , there are old railwa
y tracks on the floor"
9082  DATA "in the old gold mine
 you slip   and fall into a deep
 hole the   green slime on the w
alls makes  you fall in"
9083  DATA "on a mountain pass w
hich has     stopped on the shore
s of a giantlake which is to the
 south-east"
9084  DATA "on a small wooden je
tty ,to the east , south & south
-east is thegiant lake"
9085  DATA "d","d","d","d","d"
9090  DATA "on a mountain pass w
hich has     stopped on the shore
s of a giantlake which is to the
 south-west & south"
9091  DATA "in a partially flood
ed tunnel , there are old railwa
y tracks on the floor"
9092  DATA "in a partially flood
ed tunnel , there are old railwa
y tracks on the floor"
9093  DATA "on a mountain pass w
hich has     stopped on the shore
s of a giantlake which is to the
 east"
9094 DATA "d","d","d","in the el
ven town hundreds of   elves rus
h out to greet you","d","d","d"
9101  DATA 0,1,1,0,0,0,1,0
9102  DATA 0,1,1,1,0,0,1,1
9103  DATA 0,1,1,1,0,0,1,1
9104  DATA 0,1,1,1,0,0,1,1
9105  DATA 0,2,2,1,0,0,1,1
9106  DATA 0,3,3,0,0,0,0,0
9107  DATA 0,1,3,3,0,0,0,0
9108  DATA 0,1,3,3,0,0,4,0
9109  DATA 0,4,4,3,0,0,0,0
9110  DATA 0,0,0,0,0,0,0,4
9111  DATA 1,1,1,0,1,0,1,0
9112  DATA 1,1,1,1,1,1,1,1
9113  DATA 1,1,1,1,1,1,1,1
9114  DATA 1,2,2,1,0,1,2,1
9115  DATA 0,1,0,0,1,0,0,0
9116  DATA 3,1,0,1,0,0,0,1
9117  DATA 3,1,1,0,0,0,0,0
9118  DATA 3,4,4,1,0,0,0,0
9119  DATA 0,0,0,0,0,0,0,4
9120  DATA 0,3,0,0,0,0,0,0
9121  DATA 1,1,1,0,1,0,2,0
9122  DATA 1,1,1,1,1,1,1,1
9123  DATA 1,1,1,1,1,1,1,1
9124  DATA 0,0,1,0,0,0,0,0
9125  DATA 0,0,1,1,0,0,0,0
9126  DATA 3,0,1,1,0,0,0,0
9127  DATA 1,1,4,1,0,0,4,0
9128  DATA 0,4,0,0,0,0,0,0
9129  DATA 0,1,1,0,0,0,0,0
9130  DATA 1,1,0,1,0,0,0,0
9131  DATA 1,1,1,0,1,0,1,0
9132  DATA 1,2,2,1,1,1,2,0
9133  DATA 1,2,2,0,0,1,2,0
9134  DATA 0,0,0,0,1,1,1,0
9135  DATA 0,1,1,0,0,0,1,0
9136  DATA 0,1,1,1,0,0,1,1
9137  DATA 1,0,4,1,4,0,0,1
9138  DATA 0,0,0,0,0,0,4,0
9139  DATA 1,0,1,0,0,0,0,0
9140  DATA 1,1,0,1,0,0,0,0
9141  DATA 1,2,2,0,0,0,2,0
9142  DATA 1,2,2,0,0,1,2,0
9143  DATA 0,1,1,0,0,0,0,0
9144  DATA 0,0,0,1,0,0,1,0
9145  DATA 1,1,1,0,1,1,1,1
9146  DATA 1,0,1,1,1,1,1,1
9147  DATA 0,0,1,1,0,1,0,0
9148  DATA 0,0,4,1,0,0,0,0
9149  DATA 0,4,0,0,0,0,0,0
9150  DATA 1,1,0,1,0,0,0,0
9151 DATA 0,1,1,0,0,0,0,0
9152 DATA 0,1,1,1,1,0,1,0
9153 DATA 1,1,0,1,0,0,0,1
9154 DATA 0,0,1,0,1,0,0,0
9155 DATA 0,0,1,1,1,1,0,0
9156 DATA 0,0,0,1,0,1,0,0
9157 DATA 0,0,1,0,0,1,0,0
9158 DATA 0,0,5,1,0,0,0,0
9159 DATA 0,0,0,0,0,0,0,5
9160  DATA 1,1,0,5,0,0,0,0
9161  DATA 1,1,0,0,0,0,0,0
9162  DATA 1,0,1,0,1,0,0,0
9163  DATA 1,0,0,1,0,1,0,0
9164  DATA 0,1,0,0,0,0,1,0
9165  DATA 0,1,1,1,0,0,1,1
9166  DATA 0,1,1,1,0,0,4,1
9167  DATA 0,4,1,1,0,0,0,1
9168  DATA 0,0,1,1,0,0,0,0
9169  DATA 0,1,0,1,0,0,1,1
9170  DATA 1,0,0,0,0,0,0,0
9171 DATA 1,1,0,0,0,0,0,0
9172 DATA 0,1,0,0,0,0,0,0
9173 DATA 1,1,0,0,0,0,0,0
9174 DATA 1,1,1,1,1,0,0,0
9175 DATA 1,0,1,1,1,1,0,0
9176 DATA 1,0,4,1,1,1,0,0
9177 DATA 0,0,0,1,0,0,0,0
9178 DATA 0,0,1,0,1,0,0,0
9179 DATA 1,0,1,1,0,0,0,0
9180 DATA 0,1,0,1,0,1,0,0
9181 DATA 1,1,0,0,0,0,0,0
9182 DATA 6,1,0,0,0,0,0,0
9183 DATA 1,1,0,0,0,0,1,0
9184 DATA 1,1,4,0,0,0,4,0
9185 DATA 0,4,4,0,0,0,4,4
9186 DATA 0,4,4,4,4,0,1,4
9187 DATA 0,1,4,4,0,0,4,4
9188 DATA 0,4,4,4,0,0,4,1
9189 DATA 0,4,0,4,0,0,0,4
9190 DATA 1,4,0,0,0,0,0,4
9191 DATA 1,0,1,0,0,0,0,0
9192 DATA 1,0,0,1,0,0,0,0
9193 DATA 1,0,4,0,0,0,0,0
9194 DATA 0,0,4,0,4,0,0,0
9195 DATA 4,0,4,4,4,0,0,0
9196 DATA 4,0,1,4,4,4,0,0
9197 DATA 9,9,9,9,9,9,9,9
9198 DATA 4,0,4,1,4,4,0,0
9199 DATA 4,0,4,4,0,4,0,0
9200 DATA 0,0,0,4,0,4,0,0
9910  PRINT "You have finished t
his adventure with ";w$: BEEP 1,
20: BEEP 1,30: BEEP .5,20: BEEP
.5,20
```

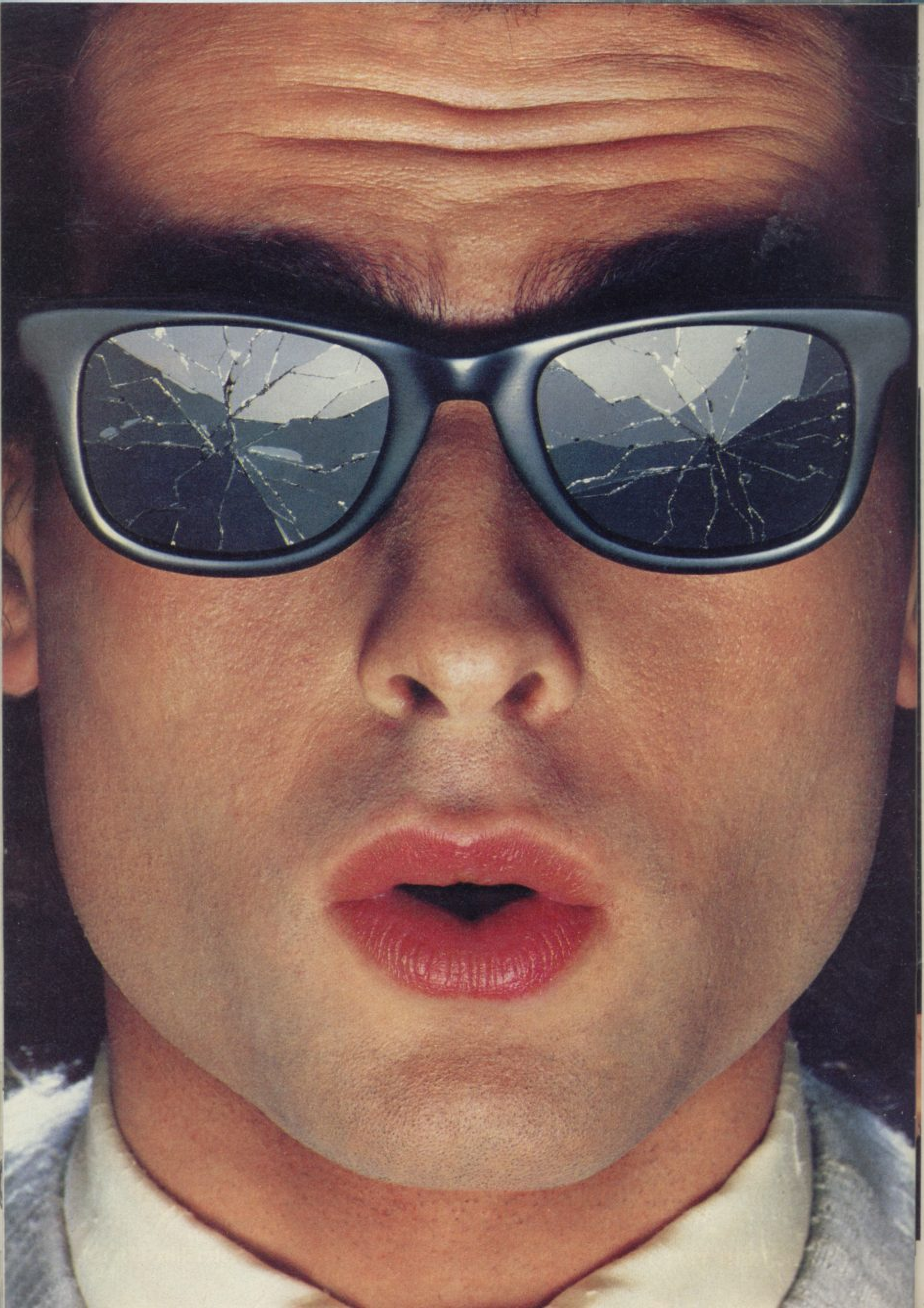
# Infinite Scroll

REMOVE the pauses in a long screen listing with the **Infinite Scroll** utility for the 16K Spectrum.

Written by Jonathan Hatcher of Bournemouth in Sussex is allows fast smooth scrolling through any Basic program without have to press 'ENTER' to continue. It is a boon to all programmers.

```
   4 CLEAR 32338
   5 GO TO 1000
  10 DATA 62,40,237,71,237,94,20
1,0,0,255,243,245,197,229,213,58
,228,126,254,1,40,8,205,164,126,
62,1,50,228,126
  20 DATA 62,255,50,140,92,62,12
7,219,254,230,2,32,32,62,127,219
,254,230,1,32,24,62,1,50,140,92,
24,17,62,62
  30 DATA 237,71,237,86,205,176,
126,62,0,50,228,126,205,3,19,209
,225,193,241,251,201,33,29,64,17
,222,126,6,3,205
  40 DATA 188,126,201,33,29,64,1
7,225,126,6,3,205,188,126,201,19
7,213,229,26,111,38,0,41,41,41,2
35,33,0,60,25
  50 DATA 235,225,6,8,229,26,119
,19,36,16,250,225,209,35,19,193,
16,223,201,32,79,78,79,70,70,0
1000 GO SUB 2000: LET tot=0: FOR
 c=32339 TO 32484: READ d: LET t
ot=tot+d: POKE c,d: NEXT c
1010 IF tot<>16599 THEN  CLS : P
RINT AT 10,0; BRIGHT 1; INK 7; P
APER 1;"DATA ENTRY ERROR PLEASE
RE-CHECK": FOR F=1 TO 10: BEEP .
01,F: NEXT F: STOP
1015 PRINT AT 21,5;"PRESS ANY KE
Y TO SAVE"
1020 SAVE "16KSCROLL"CODE 32339,
146
1030 CLS : PRINT AT 10,5;"REWIND
 TAPE TO VERIFY"
1040 VERIFY ""CODE
1999 STOP
2000 PRINT AT 8,3;"TO START SCRO
LL ENTER:-";AT 10,5;"RANDOMIZE U
SR 32339";AT 12,3;"TO STOP SCROL
L ENTER:-";AT 14,5;"RANDOMIZE US
R 32397"
2005 PRINT AT 16,5;"TO PAUSE SCR
OLL PRESS:-";AT 17,0;"SYMBOL SHI
FT TOGETHER WITH SPACE"
2010 RETURN
```





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**Bristol.** Laskys, 16-20 Penn Street. Tel: 0272 20421.
**Keynsham.** Key Computer Systems, 42b High Street. Tel: 02756 5575.
**Weston-super-Mare.** K & K Computers, 32 Alfred Street. Tel: 0934 419324.

**BEDFORDSHIRE**

**Bedford.** Boots, The Harpur Centre, Harpur Street. Tel: 0234 56231.
**Dunstable.** Dormans, 7-11 Broad Walk. Tel: 0582 38302.
**Leighton Buzzard.** Datasine, 59 North Street. Tel: 0525 374200.
**Leighton Buzzard.** Milton Keynes Music & Computers, 17 Bridge Street. Tel: 0525 382504.
**Luton.** Hobbyte, Unit 16, The Arndale Centre. Tel: 0582 457195.
**Luton.** Laskys, 190-192 Arndale Centre. Tel: 0582 38302.
**Luton.** Terry More, 49 George Street. Tel: 0582 23391.

**BERKSHIRE**

**Reading.** Heelas, Broad Street. Tel: 0734 559555.
**Reading.** Laskys, 118-119 Friar St. Tel: 0734 595459
**Slough.** Data Supplies, Templewood Lane, Farnham Common. Tel: 2 820004.
**Slough.** Laskys, 75 Queensmere Centre. Tel: 0753 78269.
**Slough.** MV Games, 245 High Street. Tel: 75 21594.

**BUCKINGHAMSHIRE**

**Bletchley.** RAMS Computer Centre, 117 Queensway. Tel: 0908 647744.
**Chesham.** Reed Photo & Computers, 113 High Street. Tel: 0494 783373.
**Milton Keynes.** John Lewis, 11 Field Walk, Secklow Gate East, Tel: 0908 679171.

**CAMBRIDGESHIRE**

**Cambridge.** Boots, 65-67 Sidney Street and 28 Petty Curry Street. Tel: 0223 350213.
**Cambridge.** Heffers Stationers, 19 Sidney Street. Tel: 0223 358241.
**Cambridge.** Robert Sayle, St Andrews Street. Tel: 0223 612929.
**Peterborough.** Boots, 40-42 Bridge Street, Queensgate. Tel: 0733 65352.
**Peterborough.** John Lewis, Queensgate Centre. Tel: 0733 44644.

**CHESHIRE**

**Chester.** Boots, 47-55 Foregate Street. Tel: 0244 28421.
**Chester.** Computer Link, 21 St Werburgh Street. Tel: 0244 316516.
**Chester.** Laskys, 7 The Forum, Northgate Street. Tel: 0244 317667.
**Crewe.** AS Wootton & Sons, 116 Edleston Road. Tel: 0270 214118.
**Crewe.** Midshires Computer Centre, 68-78 Nantwich Road. Tel: 0270 211086.
**Ellesmere Port.** RFR TV & Audio, 1 Pooltown Road, Whitby. Tel: 051-356 4150.
**Hyde.** C Tech Computers, 184 Market Street. Tel: 061-366 8223.
**Macclesfield.** Camera Computer Centre, 118 Mill Street. Tel: 0625 27468.
**Macclesfield.** Computer Centre, 68 Chestergate. Tel: 0625 618827.
**Marple.** Marple Computer Centre, 30-32 Market Street. Tel: 061-427 4328.
**Stockport.** National Micro Centres, 36 St Petersgate. Tel: 061-429 8080.
**Stockport.** Stockport Micro Centre, 4-6 Brown Street. Tel: 061-477 0248.
**Widnes.** Computer City, 78 Victoria Road. Tel: 051-420 3333.
**Wilmslow.** Wilmslow Micro Centre, 62 Grove Street. Tel: 0625 530890.

**CLEVELAND**

**Middlesbrough.** Boots, 88-90 Linthorpe Road, The Cleveland Centre. Tel: 0642 249616.

**CUMBRIA**

**Kendal.** The Kendal Computer Centre, Stramongate. Tel: 0539 22559.
**Whitehaven.** PD Hendren, 15 King Street. Tel: 0946 2063.
**Workington.** Technology Store, 12 Finkle Street. Tel: 0900 66972.

**DERBYSHIRE**

**Alfreton.** Gordon Harwood, 69-71 High Street. Tel: 0773 836781.
**Chesterfield.** Boots, 35-37 Low Pavement, Market Place. Tel: 0246 203591.
**Chesterfield.** Computer Stores, 14 Stephenson Place. Tel: 0246 208802.

**DEVON**

**Exeter.** Boots, 251 High Street. Tel: 0392 32244.
**Exeter.** Open Channel, Central Station, Queen Street. Tel: 0392 218187.
**Plymouth.** Syntax, 76 Cornwall Street. Tel: 0752 28705.
**Seaton.** Curtis Computer Services, Seaton Computer Shop, 51c Harbour Road. Tel: 0297 22347.
**Tiverton.** Actron Microcomputers, 37 Bampton Street. Tel: 0884 252854.

**DORSET**

**Bournemouth.** Brook Computers, 370 Charminster Road. Tel: 0202 533054.
**Bournemouth.** Lansdowne Computer Centre, 1 Lansdowne Crescent, Lansdowne. Tel: 0202 20165.
**Dorchester.** The Paper Shop, Kings Road. Tel: 0305 64564.

**ESSEX**

**Chelmsford.** Maxton Hayman, 5 Broomfield Road. Tel: 0245 354595.
**Colchester.** Boots, 5-6 Lion Walk. Tel: 0206 577303.
**Grays.** H Reynolds, 28a Southend Road. Tel: 0375 31641.
**Harlow.** Laskys, 19 The Harvey Centre. Tel: 0279 443495.
**Hornchurch.** Comptel Computer Systems, 112a North Street. Tel: 0402 446741.
**Ilford.** Boots, 177-185 High Road. Tel: 01-553 2116.
**Southend-on-Sea.** Computerama, 88 London Road. Tel: 0702 335443.
**Southend-on-Sea.** Computer Centre, 336 London Road. Tel: 0702 337161.
**Southend-on-Sea.** Estuary Personal Computers, 318 Chartwell North, Victoria Circus Shopping Centre. Tel: 0702 614131.

**GLOUCESTER**

**Cheltenham.** Laskys, 206 High Street. Tel: 0242 570282.
**Cheltenham.** Screen Scene, 144 St Georges Road. Tel: 0242 528979.
**Gloucester.** Boots, 38-46 Eastgate Street. Tel: 0452 423501.

**HAMPSHIRE**

**Basingstoke.** Fishers, 2-3 Market Place. Tel: 0256 22079.
**Southampton.** Business Electronics, Micromagic At Atkins, 7 Civic Centre Road. Tel: 0703 25903.
**Southampton.** Tyrrell & Green, Above Bar. Tel: 0703 27711.

**HERTFORD**

**Hitchin.** County Computers, 13 Bucklesbury. Tel: 0462 36757.
**Hitchin.** GK Photographic & Computers, 68 Hermitage Road. Tel: 0462 59285.
**Potters Bar.** The Computer Shop, 197 High Street. Tel: 0707 44417.
**Stevenage.** DJ Computers, 11 Town Square. Tel: 0438 65501.
**Watford.** Laskys, 18 Charter Place. Tel: 0923 31905.
**Watford.** SRS Microsystems, 94 The Parade, High Street. Tel: 0923 26602.
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**HUMBERSIDE**

**Beverley.** Computing World, 10 Swabys Yard, Dyer Lane. Tel: 0482 881831.

**KENT**

**Beckenham.** Supa Computers, 425 Croydon Road. Tel: 01-650 3569.
**Bexleyheath.** Laskys, 15-16 Broadway Shopping Centre. Tel: 01-301 3478.
**Bromley.** Boots, 148-154 High Street. Tel: 01-460 6688.
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**Bromley.** Walters Computers, Army & Navy, 64 High Street. Tel: 01-460 9991.
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**Sevenoaks.** Ernest Fielder Computers, Dorset Street. Tel: 0732 456800.
**Sittingbourne.** Computer Plus, 65 High Street. Tel: 0795 25677.
**Tunbridge Wells.** Modata Computer Centre, 28-30 St Johns Road. Tel: 0892 41555.

**LANCASHIRE**

**Blackburn.** Tempo Computers, 9 Railway Road. Tel: 0254 691333.
**Blackpool.** Blackpool Computer Store, 179 Church Street. Tel: 0253 20239.
**Burnley.** IMO Business Systems, 39-43 Standish Street. Tel: 0282 54299.
**Preston.** 4Mat Computing, 67 Friargate. Tel: 0772 561952.
**Preston.** Laskys, 1-4 Guildhall Arcade. Tel: 0772 24558.
**Wigan.** Wildings Computer Centre, 11 Mesnes Street. Tel: 0942 44382.

**LEICESTERSHIRE**

**Leicester.** Boots, 30-36 Gallowtree Gate. Tel: 0533 21641.
**Market Harborough.** Harborough Home Computers, 7 Church Street. Tel: 0858 63056.

**LONDON**

**W1.** Computers of Wigmore Street, 104 Wigmore Street. Tel: 01-486 0373.
**W1.** HMV, 363 Oxford Street. Tel: 01-629 1240.
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**W1.** Laskys, 42 Tottenham Court Road. Tel: 01-636 0845.
**W1.** Lion House, 227 Tottenham Court Road. Tel: 01-637 1601.
**W1.** Rother Cameras, 256 Tottenham Court Road. Tel: 01-580 5826.
**W1.** The Video Shop, 18 Tottenham Court Road. Tel: 01-580 5380.
**W1.** Walters Computers, DH Evans, Oxford Street. Tel: 01-629 8800.
**WC1.** Transam Micro Systems, 59-61 Theobalds Road. Tel: 01-405 5240.
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**W8.** Walters Computers, Barkers, Kensington High Street. Tel: 01-937 5432.
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**SE9.** Square Deal, 373-375 Footscray Road, New Eltham. Tel: 01-859 1516.
**Lewisham.** Laskys, 164 High Street. Tel: 01-852 1375.
**SE13.** Walters Computers, Army & Navy, 33 and 63 High Street, Lewisham. Tel: 01-852 4321.
**SE15.** Castlehurst Ltd, 152 Rye Lane, Peckham. Tel: 01-639 2205.
**EC2.** Devron Computer Centre, 155 Moorgate. Tel: 01-638 3339.
**N7.** Jones Brothers, Holloway Road. Tel: 01-607 2727.
**N14.** Logic Sales, 19 The Bourne, The Broadway, Southgate. Tel: 01-882 4942.
**NW3.** Maycraft Micros, 58 Rosslyn Hill, Hampstead. Tel: 01-431 1300.
**NW4.** Davinci Computer Store, 112 Brent Street, Hendon. Tel: 01-202 2272.
**NW7.** Computers Inc, 86 Golders Green. Tel: 01-209 0401.
**NW10.** Technomatic, 17 Burnley Road, Wembley. Tel: 01-208 1177.

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**Manchester.** Boots, 32 Market Street. Tel: 061-832 6533.
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**Manchester.** Mighty Micro, Sherwood Centre, 268 Wilmslow Road, Fallowfield. Tel: 061-224 8117.
**Manchester.** NSC Computer Shops, 29 Hanging Ditch. Tel: 061-832 2269.
**Oldham.** Home & Business Computers, 54 Yorkshire Street. Tel: 061-633 1608.
**Swinton.** Mr Micro, 69 Partington Lane. Tel: 061-728 2282.

**MERSEYSIDE**

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**Liverpool.** George Henry Lee, Basnett Street. Tel: 051-709 7070.
**Liverpool.** Hargreaves, 31-37 Warbreck Moor, Walton. Tel: 051-525 1782.
**Liverpool.** Laskys, Dale Street. Tel: 051-236 3298.
**Liverpool.** Laskys, St Johns Precinct. Tel: 051-708 5871.
**St Helens.** Microman Computers, Rainford Industrial Estate, Mill Lane, Rainford. Tel: 0744 885242.
**Southport.** Central Studios, 38 Eastbank Street. Tel: 0704 31881.

**MIDDLESEX**

**Enfield.** Laskys, 44-48 Palace Garden Shopping Centre. Tel: 01-363 6627.
**Harrow.** Camera Arts, 42 St Anns Road. Tel: 01-427 5469.
**Hounslow.** Boots, 193-199 High Street. Tel: 01-570 0156.
**Teddington.** Andrews, Broad Street. Tel: 01-977 4716.
**Twickenham.** Twickenham Computer Centre, 72 Heath Road. Tel: 01-892 7896.
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**NORFOLK**

**Norwich.** Bonds, All Saints Green. Tel: 0603 24617.

**NOTTINGHAMSHIRE**

**Sutton in Ashfield.** H N & L Fisher, 87 Outram Street. Tel: 0623 54734.
**Nottingham.** Jessops, Victoria Centre. Tel: 0602 418282.
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**OXFORDSHIRE**

**Abingdon.** Ivor Fields Computers, 21 Stert Street. Tel: 0235 21207.
**Banbury.** Computer Plus, 2 Church Lane. Tel: 0295 55890.
**Oxford.** Science Studio, 7 Little Clarenden Street. Tel: 0865 54022.

**SCOTLAND**

**Edinburgh.** Boots, 101-103 Princes Street. Tel: 031-225 8331.
**Edinburgh.** John Lewis, St James Centre. Tel: 031-556 9121.
**Edinburgh.** Laskys, 4 St James Centre. Tel: 031-556 1864.
**Glasgow.** Boots, 200 Sauchiehall Street. Tel: 041-332 1925.
**Glasgow.** Boots, Union Street and Argyle Street. Tel: 041-248 7387.

**SHROPSHIRE**

**Telford.** Telford Electronics, 38 Mall 4. Tel: 0952 504911.

**STAFFORDSHIRE**

**Newcastle-under-Lyme.** Computer Cabin, 24 The Parade, Silverdale. Tel: 0782 636911.
**Stafford.** Computerama, 59 Foregate Street. Tel: 0785 41899.
**Stoke-on-Trent.** Computerama 11 Market Square Arcade, Hanley. Tel: 0782 268524.

**SUFFOLK**

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**Ipswich.** Brainwave Micros, 24 Crown Street. Tel: 047 350965.

**SURREY**

**Croydon.** Laskys 77-81 North End. Tel: 01-681 8443.
**Croydon.** The Vision Store, 96-98 North End. Tel: 01-681 7539.
**South Croydon.** Concise Computer Consultants, 1 Carlton Road. Tel: 01-681 6842.
**Epsom.** The Micro Workshop, 12 Station Approach. Tel: 0372 721533.
**Guildford.** Walters Computers, Army & Navy, 105-111 High Street. Tel: 0483 68171.
**Haslemere.** Haslemere Computers, 17 Lower Street. Tel: 0428 54428.
**Wallington.** Surrey Micro Systems, 53 Woodcote Road. Tel: 01-647 5636.
**Woking.** Harpers, 71-73 Commercial Way. Tel: 0486 225657.

**SUSSEX**

**Bexhill-on-Sea.** Computerware, 22 St Leonards Road. Tel: 0424 223340.
**Brighton.** Boots, 129 North Street. Tel: 0273 27088.
**Brighton.** Gamer, 71 East Street. Tel: 0273 728681.
**Brighton.** Laskys, 151-152 Western Road. Tel: 0273 725625.
**Crawley.** Gatwick Computers, 62 The Boulevard. Tel: 0293 37842.
**Crawley.** Laskys, 6-8 Queensway. Tel: 0293 544622.

**TYNE & WEAR**

**Newcastle-upon-Tyne.** Bainbridge, Eldon Square. Tel: 0632 325000.
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**WALES**

**Aberdare.** Inkey Computer Services, 70 Mill Street, The Square, Trecynon. Tel: 0685 881828.
**Aberystwyth.** Aberdata at Galloways, 23 Pier Street. Tel: 0970 615522.
**Cardiff.** Boots, 26 Queens Street & 105 Frederick Street. Tel: 0222 31291.
**Cardiff.** P & P Computers, 41 The Hayes. Tel: 0222 26666.
**Swansea.** Boots, 17 St Marys Arcade, The Quadrant Shopping Centre. Tel: 0792 43461.

**WARWICKSHIRE**

**Coventry.** Coventry Micro Centre, 33 Far Gosford Street. Tel: 0203 58942.
**Coventry.** JBC Micro Services, 200 Earlsdon Avenue, North Earlsdon. Tel: 0203 73813.
**Coventry.** Laskys, Lower Precinct. Tel: 0203 27712.
**Leamington Spa.** IC Computers, 43 Russell Street. Tel: 0926 36244.
**Leamington Spa.** Leamington Hobby Centre, 121 Regent Street. Tel: 0926 29211.
**Nuneaton.** Micro City, 1a Queens Road. Tel: 0203 382049.
**Rugby.** OEM Computer Systems, 9-11 Regent Street. Tel: 0788 70522.

**WEST MIDLANDS**

**Birmingham.** Boots, City Centre House, 16-17 New Street. Tel: 021-643 7582.
**Birmingham.** Laskys, 19-21 Corporation Street. Tel: 021-632 6303.
**Dudley.** Central Computers, 35 Churchill Precinct. Tel: 0384 238169.
**Stourbridge.** Walters Computer Systems, 12 Hagley Road. Tel: 0384 370811.
**Walsall.** New Horizon, 1 Goodall Street. Tel: 0922 24821.
**West Bromwich.** D S Peakman, 7 Queens Square. Tel: 021-525 7910.
**Wolverhampton.** Laskys, 2 Wulfrum Square. Tel: 0902 714568.

**YORKSHIRE**

**Bradford.** Boots, 11 Darley Street. Tel: 0274 390891.
**Leeds.** Boots, 19 Albion Arcade, Bond Street Centre. Tel: 0532 33551.
**Sheffield.** Cole Brothers, Barkers Pool. Tel: 0742 78511.
**Sheffield.** Laskys, 58 Leopold Street. Tel: 0742 750971.
**York.** York Computer Centre, 7 Stonegate Arcade. Tel: 0904 641862.



## Contents

Mike Wright assesses new packages for Spectrum and QL on page 103, and there are more goodies in the Shop Window on page 104.

# SINCLAIR BUSINESS USER

## Transform top

REFERRING to the letter 'Transform Warning' in your January 1985 issue, I feel that Mr Delby has been remarkably unfortunate with his professional keyboard from Transform. I bought one some months ago and had no problems except for an occasional jump in picture response.

The letter enclosed by Transform said that I might have problems with Spectrum Issue Three, which I have, and following a most helpful phone conversation, I purchased the recommended buffer — delivered in under 24 hours. Since then I have had perfect results from my keyboard and Spectrum — including microdrive, printer, **Tasword II**, **Masterfile**, **Tasmerge** and so on.

Would that more suppliers were as co-operative as Transform.

**M G Miller,**
**Chertsey,**
**Surrey.**

IN ANSWER to L S Delby, who condemns the Transform keyboard, I have such a keyboard and have experienced no problems whatsoever.

He should realise that no matter how strict quality control is, the odd defective unit does escape detection.

If he had looked at past issues of *Sinclair User* he should have noticed that in the June 1984 edition, in the review of keyboards, it was stated that there were some problems with the keyboard when used with Issue Three Spectrums, so he had been forewarned.

I recommend all readers considering buying a keyboard to consider strongly the Transform keyboard; it is excellent.

**Derek Easton,**
**Falkirk,**
**Scotland.**

## Spreadsheet satisfaction

I READ in the January issue the letter from W L Simpson and it prompts me to write, not just on that particular question, but generally on the Spectrum.

My company has Olivetti and Tandy computers, which I use regularly; but on a number of occasions I have used my Spectrum for the development of new systems.

This letter was typed on a 48K Spectrum using **Tasword II**, which I have also used for producing a small mail-shot. I also use **Omnicalc** for our annual budget, and in addition have recently devised a computer estimating system.

Probably the best business program for the Spectrum is Campbell's **Masterfile**. I am using this program to develop an order entry system and related production list.

So the answer to Mr Simpson is that **Omnicalc** is a reliable and useful tool. The Spectrum is capable of excellent work and will give real benefits to any serious business user.

**M A Harris,**
**Edenbridge,**
**Kent.**

I NOTED with interest the letter from W L Simpson since I am also a church treasurer and employ a 48K Spectrum in connection with that task.

I find the Campbell **Masterfile** package best because although it is not a true spreadsheet — one does need a pencil from time to time — that is balanced by the ease of creating records coupled with the ability to total by category.

I handle accounts bearing upwards of 600 entries each year and certainly the Spectrum with **Masterfile** has made the preparation of interim and final balance sheets very much quicker. It is also easy at finance committee meetings to find specific items.

While on the subject I have written programs in both Basic and Pascal — using the Hisoft compiler — to compile figures for the recovery of income tax relating to deeds of covenant.

**E W Bromley,**
**Biggleswade,**
**Buckinghamshire.**

## Unjustifiable criticism?

I WAS interested to see your review of Wafadrive and **Spectral Writer** in the December issue, and I agree with most of your reviewer's comments. However, he was wrong when he said that you cannot justify a paragraph at a time with **Spectral Writer.** The AND command is used to reform a single paragraph with Spectral Writer, exactly as the STEP command is used in **Tasword.**

I have found only one problem with Spectral, and perhaps a reader may be able to help me. I was able to add another option to the **Tasword** menu, to allow for printing multiple copies of reports without having to return to the menu and printing option after each copy. It is just a simple FOR — NEXT loop which repeats the printing process a specified number of times. Provided you enter a form feed printer control at the end of the last page of your text, it works perfectly.

A similar arrangement will not work with Spectral, because it prints from the cursor to the end of the file, and after the first printing the cursor stays at the end of the text until you return to the text file option.

**Carol Brooksbank,**
**14, Willow Grove,**
**Tile Hill,**
**Coventry CV4 9EP.**

# TRANSFORM LTD. Business Software

# Are you taking your Spectrum seriously?



**£69.95** plus £2.00 p&p

The Transform Keyboard transforms your Spectrum into a fully operational professional machine.

- Will incorporate micro-drive interface and power supply
- 60 keys including fullsize space bar
- Large ENTER key
- Full stop, comma, semi-colon, colon, single delete and edit keys
- On/off switch with LED
- Easy installation — no soldering required
- Black anodised case
- Now with 3 colour printed key tops
- EMODE key

*"Its price of £69.95 reflects the kind of use to which it will be put but it is certainly the top keyboard at the moment."*

SINCLAIR USER JUNE 1984

## Business Software

**Business Bank Account £10.75**
This program will enable you to enter debits under 17 different subheadings. Statements include totals of all subheadings.

**Sales Day Book £10.75**
For all your invoices, this program will enable you to prepare statements of outstanding invoices. Program will also calculate VAT.

**Purchase Day Book £10.75**
Keeps a complete record of all your purchases under 17 different subheadings. This program also calculates VAT.

**Business Pack £25.00**
Including all the above programs.

**Stock Control £10.75**
Handles 900 lines, including details of supplier. Program has full search facilities enabling you to search and update all lines from one supplier.

**Invoicing £15.00**
This program will print out invoices, calculates discounts and VAT. The program will calculate totals from unit prices. Up to 50 accounts with 250 outstanding invoices.

**Word Processing** by Tasman **£13.90**
Tasword Two is a powerful word processing program that will perform all the functions available on large processors. The program will give you 64 characters per line on screen.

**Masterfile** by Campbell Systems **£15.00**
This is one of the best database programs available for the ZX Spectrum. This program has many uses in a small business.

**Dlan** by Campbell Systems **£7.95**
Use your Spectrum to sell your products. Dlan will display messages in up to 11 different typefaces. Will scroll text in any direction.

**64 Column Generator** by Tasman **£5.50**
You can use this program within your other programs to display 64 columns on screen.

**Payroll** by Byte One **£19.95**
This payroll program will handle up to 40 employees and will calculate NIC, PAYE, superannuation and many other deductions. This is a very user friendly program and extremely good value.

## NEW

**Sales/Purchase Ledger Invoicing £25.00**
This program is for use on micro-drive only. The program will print an invoice using a built-in price list and post the invoice to your customer's account. Will also print price lists, statements, labels etc.

**Tasmerge £10.95**
Allows you to transfer data from Masterfile into Tasword enabling you to use Tasword for mail merge. The program allows you to specify line and column of each field. For use on micro-drive only.

**Superfile £14.95**
This is a new database program that stores pages of text 64 columns x 22 rows. The program includes word processing and full search facilities.

**Omnicalc 2 £14.95**
This is the long-awaited micro-drive version of omnicalc complete with histograms and many other features.

**Projector 1 £13.90**
Business graphics program that will help you present your cashflow, sales expenditure in many different ways including pie line, and histogram charts.

**Tasprint £9.90**
Use this program with Tasword Two to produce 5 different fonts on a dot matrix printer.

**MF-Print £6.95**
Enables you to set a print format for your full-size printer within masterfile. Supplied complete with masterfile for **£19.95**.

**Trans Express £9.95**
Micro-drive utility program which will enable you to backup all your micro-drive cartridges.

**Now in stock**

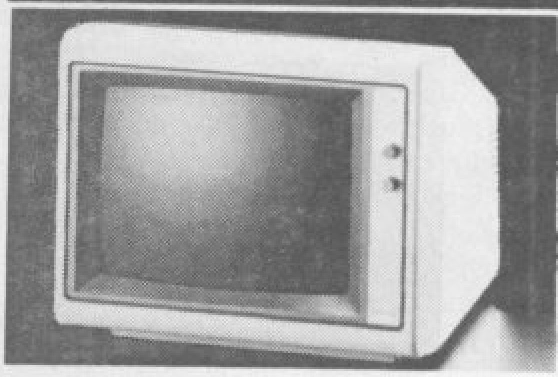
| | |
|---|---|
| Blank micro-drive cartridges | £4.95 |
| Continuous paper | £12.99 |
| Printer ribbons from | £3.50 |

## QL

| | |
|---|---|
| Centronics Interface | £39.95 |
| QL Dust Cover | £5.00 |

Transform can supply a wide range of printers, monitors, and leads for the QL. For further details send S.A.E.

## Monitors



It is possible to connect your Spectrum to both Black/Green and composite Video monitors using high resolution monitors are particularly useful with programs like Tasword that use 64 columns. We supply complete instructions on how to connect monitors to both Issue Two and Issue Three Spectrums. These monitors can also be connected to your QL.

| | |
|---|---|
| Phillips black and green | £75.00 |
| Kaga/Taxan black and green | £99.95 |
| Sanyo Med res for QL | £273.60 |

## Printers

All the software we supply runs on full-size printers (unless you are using interface 1) you will require an interface to connect your Spectrum to a printer, the interface we supply uses the graphics characters to set printer codes as in Tasword and prints a double size screen dump.

| | |
|---|---|
| Centronics/RS232 Interface | £45.00 |
| **Dot matrix printers** | |
| Brother HR5 | £132.00 |
| Brother M1009 | £163.00 |
| Star Gemini 10x | £199.00 |
| Epson RX80 FT | £229.00 |
| Epson FX80 | £324.00 |
| **Daisywheel printers** | |
| Smith-Corona TP I | £189.00 |
| Silver Reed EXP500 | £284.00 |
| Brother HR15 | £349.44 |

Please add **£5.00** delivery plus VAT to the price of printers and monitors. All software prices include VAT, post and packing.

Access

TRANSFORM LTD. (Dept. SU) 01-658-6350

41, Keats House, Porchester Mead, Beckenham, Kent.

BARCLAYCARD VISA

# Sending circulars the easy way

## Documents from files: Mike Wright finds the latest software package wanting

A NEW PIECE of independent business software for the QL has arrived — **Quilmerg,** produced by Pitch Associates. It attempts to fill a space left by the original Psion package and is designed to merge database fields stored in an **Archive** file into a document created by the word processor **Quill.**

The program is written in SuperBasic and will handle documents about three pages long and with up to 15 different fields. Each field is restricted to a maximum of 25 characters.

Before **Quilmerg** is used two separate files must be produced, one of which contains the selected records from **Archive.** Once the required records have been selected they are written to a file using the Export command. Apart from the restrictions mentioned above, the fields must be character fields — they must end with a sign — and their names must be less then 15 characters long.

The second file contains the document. It is created using the print option in **Quill** and typing in the name of a microdrive file when **Quill** suggests printing to a printer. The blank document is typed in as normal but where a field is to be merged from the **Archive** file the name of the field is typed in surrounded by ‹ and ›.

The first disadvantage is that **Quilmerg** will not reformat the document after the fields have been inserted. That means, effectively, that the field name inside the brackets must be padded out to the length of the longest record. That in turn produces unsightly gaps for data with fewer characters and makes it difficult to use with text that is centred or right justified.

**Quilmerg** is loaded using the 'lrun' command. The option of loading directly from the F1 Monitor/F2 Television option has not been provided. Once run **Quilmerg** asks for the filenames of the text and merge (database) files. It also allows various parameters to be set. Those include the printer baud rate, the serial port to be used, the type of paper and the number of lines per page and characters per line.

Once the parameters have been set the program searches for the first record and displays it on the screen. You then have the option of printing the text using the record or of moving onto the next record in the file. If the print option is selected the data is merged with the text file and printed.

Once all the records have been dealt with, the message 'Quilmerg complete' is displayed and an analysis of the number of records read, printed and reprinted is shown.

The program, however, remains something of a curate's egg. The program is easy to use and certainly fills a void, yet it leaves a disappointed feeling. That may be due to the limitations on the fields and the gaps left by not reformatting the text.

Other aspects indicate a lack of thought in the preparation of the program, such as the title screen. That is fine if the program is loaded from TV mode but if you are in Monitor mode it is squashed into the right-hand window with the consequent overflow. Another minor but irritating point is at the the end of the merge, when you are dumped into SuperBasic and have to enter 'run' instead of being given the option of another run or going to SuperBasic.

Despite those disadvantages it should be pointed out that it is the only program available to fill this gap and it is certainly easier to send out circular letters this way rather than manually inside **Quill.**

**QUILMERG**
**Pitch Associates,** 39 Rockleigh Avenue, Leigh-on-Sea, Essex
Price: **£12.50**
Gilbert Factor: **5**

# Electrifying efficiency in office automation?

## A four-in-one package attempts to ease the monotony of general administration

EVEN IF your office comprises only one filing cabinet, a battered Remington, a desk and telephone, attempting to run it from a single 48K program is unlikely to make the difficult task of office automation any easier.

**Electric Office** from Fisher Software, however, is a suite of four programs on one cassette which tries to do just that. The programs consist of a word processor, mailing list, graph plotter and diary.

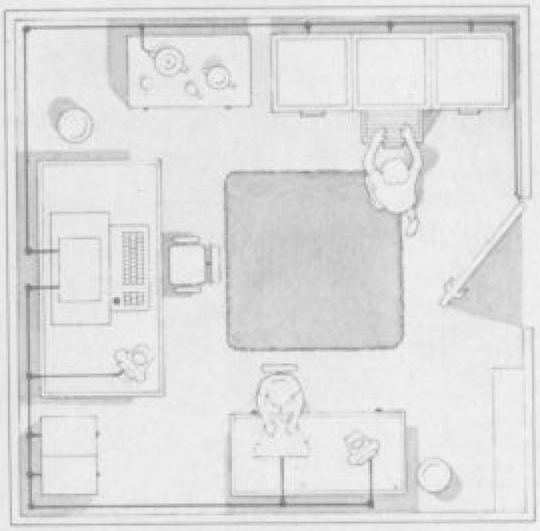
The programs are written in Basic and each one occupies about 7K. They are linked by a header program which is used to load any one of them. There is no provision for loading one program from another; each time you want to use one of the other programs you must clear the memory and again load the header.

The 'manual' consists of two A4 sheets and contains little more than the message that the programs are self-explanatory and that demonstration files are held on side two of the cassette — unfortunately absent on the review copy. The header program graphically displays a desk, chair and blackboard. The instructions are displayed, unclearly on the blackboard.

The mailing list is run by a seven-option menu which allows names, addresses and telephone numbers to be added, deleted or listed. Despite seven options the prompt on the bottom of the screen is to press keys 1 to 6.

Adding a name is easy: select option

*continued on page 104*



*continued from page 103*

1 and type in the name and address, remembering to separate the different lines by a colon. The program tells you that you may only use 60 characters but the manual quotes 100; neither mentions that you are further restricted in the number of characters per line or that a name and address must contain at least one colon.

Deleting and listing a name can be done by specifying either the record number, the name or the road. Your choice in naming files which you want to save is restricted to giving a number from 1 to 9. The program prefixes it automatically with "M.list:".

The word processor is woefully inadequate for nearly every use which can be imagined. It is run from a menu with seven options which allow text to be entered, printed, saved, loaded, wiped or displayed on screen. The seventh option clears both program and data from memory.

As new text is entered the last two lines only are displayed. ENTER is used, as usual, to start a new paragraph, but is only shown as a special character — a reverse arrow — in the text. Text can be inserted at any point by using CAPS SHIFT 1 to move to the required line, inserting a number of blank spaces and then typing in the text. Excess blanks can then be deleted using CAPS SHIFT 0.

The graph plotter can draw bar charts, line graphs or both together with up to 30 — though the manual says 32 — values or columns. Before the data is entered the screen colour, number of values, maximum and minimum values and a title must all be entered. The program then prompts for each value in turn, checking to make sure that it is within the specified range. As it is entered the value is plotted. Although the program is easy to use there are several major omissions, including the ability to edit data once it has been entered. That entails having to start afresh every time you make a mistake.

The diary is probably the best of the four programs. It enables you to make an entry for any date in any order. The entries can then be recalled by date or by listing them for a particular month. A list of the dates for which entries have been made can be displayed and the usual save and load functions complete the options.

Making an entry into the diary involves entering the date. The only error trapping seems to be on the year, where two digits must be entered. In all cases any mixture of two numbers and/or letters is acceptable. The entry to the diary is typed in normally with the only restriction on size being the amount of memory left.

When a date is entered, even one which does not exist, the program checks to see if an entry for that particular date has been made. If so, then it prompts for you to take the "recall an entry" choice and add the extra information.

**Electric Office** is a set of programs which could be useful but has been written and presented very carelessly. Of the four programs the diary is the best and is possibly a better word processor than the dedicated one. The mailing list can have few practical uses since the names cannot be merged into letters produced on the word processor. The graph plotter is easy to use but requires data preparation beforehand; care is necessary to ensure the data is entered correctly.

*Mike Wright*

**ELECTRIC OFFICE**
**Fisher Software,** 47 London Road, Buxton, Derbyshire
Memory: **48K**
Price: **£4.50 mailorder**
Gilbert Factor: **4**




*SHOP WINDOW IS a regular service to* Sinclair User *readers to enable you to publish details of specialist programs with limited markets. Details of such programs will only appear once in* Sinclair Business User, *at no charge. If readers would like details to appear regularly they should advertise in Sinclair Supermart.*

**Computer Estimating** Versatile program for use by any section of industry who prepare multi-item tenders containing rates built up from component parts and/or part use of subcontractors quotes. Can cope with up to 300 items. 48K Spectrum. SAE to A Macdonald, 8, Loch Place, South Queensferry, West Lothian.

**Duplicate Bridge Computer scoring** for the Spectrum 48K. Allows for up to 36 boards and from 4 to 250 teams, as well as catering for Howell, Mitchell or individual competitons. The program checks the scores on each hand and gives cumulative totals to date and instantaneous final placings, which can be copied to your printer. £25.00 from R F Wheen, The Grange, Rectory Lane, Buckland, Betchworth, Surrey.

**Occurance Chart.** Spectrum 48K. A histogram program to record and store four years of events in monthly charts. Each block of the bars can contain any character, including user-definable, so differing events can be identified. Colour, sound, user-definable key and printout options are included. Suggestions for use: weather, test results, crime and accident records, sales figures, sickness reports, bird spotting. £5.00.

**Telephone charge.** Spectrum (16K and 48K). Automatically records a running cost whilst you make a telephone call, with digital clock, time elapsed, name of caller, and date. £4.00.

**Questionnaire.** Spectrum 48K. Easily-entered results from a questionnaire with three answers for each question. Displays results in table form and histogram, with two lists for additional suggestions. Allows for four classes of persons' answers to be compared. Initially set for 60 questions, with printout facility. £4.00.

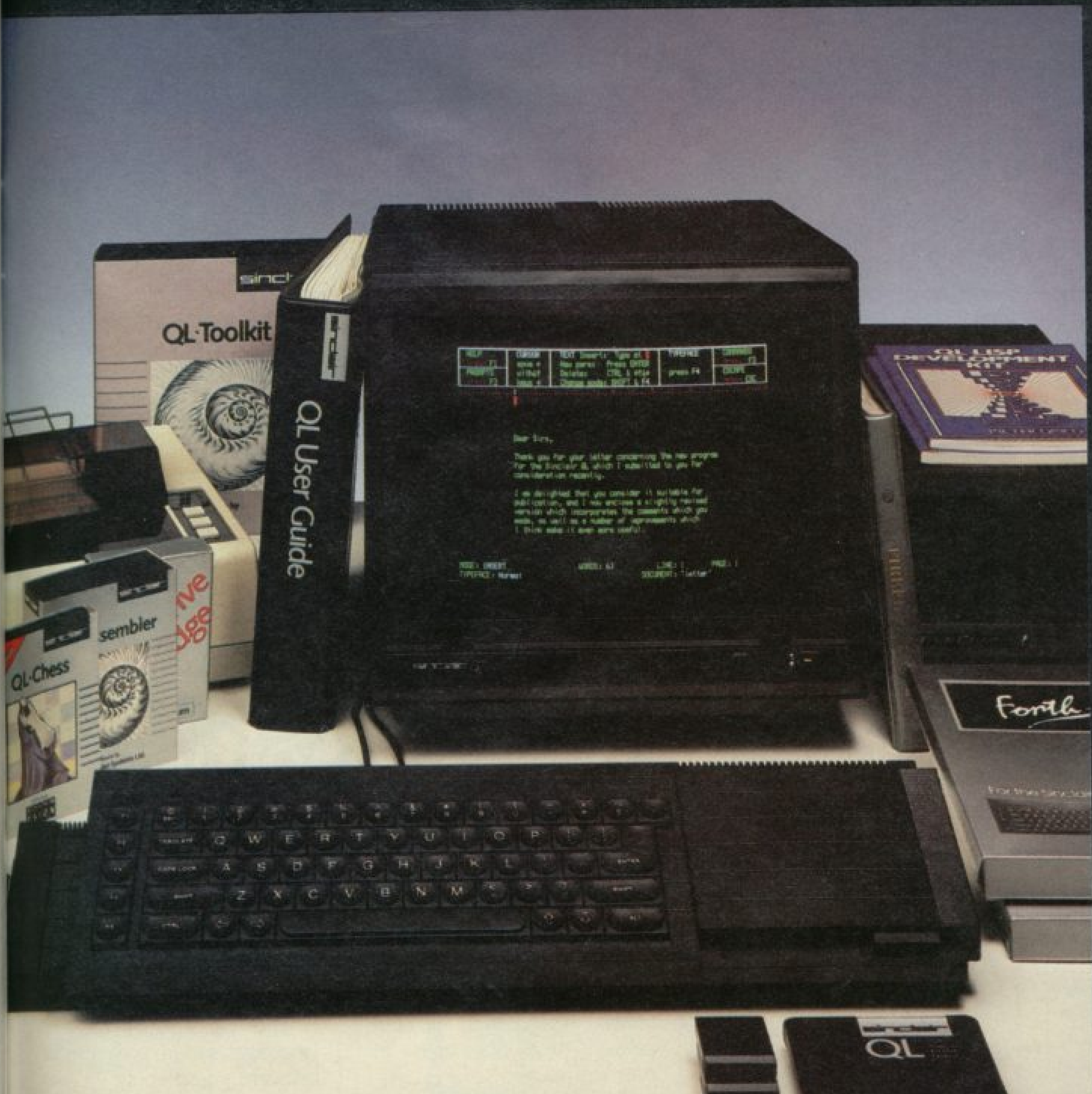
**Box Flow Chart Designer** Spectrum 48K. With vertical scrolling. When completed the chart can be used one box at a time with the ENTER key for lectures, or automatically for continuous displays. Will make 400 entries, as one or more charts. £5.00.

All programs are available from B M Wornham, 20 The Parklands, Droitwich, Worcs. WR9 7DG.

**Sail Racing.** A range of seven microdrive-compatible Spectrum programs which cover all the calculations required for handicapping, corrected times, performance indicators, series racing, with a database covering membership of a sailing club. £6.50 each inc. p&p from John Caine, 4 Birch Hill Avenue, Onchan, Isle of Man.

# QL NEWS

**News from the world of Sinclair QL computing.**




## One year old... and look how we've grown!

When we launched the QL last year, we knew we were starting a revolution.

For the first time, the serious computer hobbyist could afford the same power and performance as the professional computer user.

A year later, and the QL is more than a unique computer, it's the heart of a unique system.

And the next 12 months promise even more for QL owners... new software options, extra storage devices, printers, monitors...

Read on, and see how far we've come, and how much further we're going!

Nº1



# NIGEL SEARLE

## Now it's the quantum leap for QL software and peripherals



From sophisticated business packages to superb animated games... QL software makes the most of the computer's extraordinary specification.

Without doubt, the QL was the computer innovation of 1984. Launched to outstanding reviews, it soon gathered thousands of happy owners, and recognition from people like ICL, who have incorporated QL technology and its Microdrives into the new One Per Desk.

The quickest glance at the QL's specification shows what the fuss was all about...128K RAM, 32-bit processor architecture, 200K built-in mass storage, bundled software, They're features that would normally cost you three or four times as much!

But that's only half the story, because the QL is now the heart of a computer system, with a growing library of software...

As you'll see from these pages, 1985 is the year of the quantum leap for software and peripherals. Already there are no less than five QL languages together with special programs for software developers, a world-beating chess game... and much more on the way!

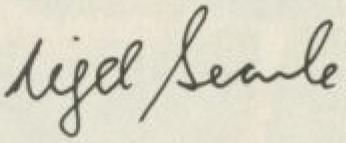
On the hardware side, there's a special QL monitor to make the most of that high-resolution 512 x 256 pixel display. There are memory expansion boards, Winchester disk drives, printers, and low-cost Microdrive cartridges.

In fact, there's so much going on, we'll be running these regular Newsletters just to keep you in touch!

If you already own a QL, the next few pages will give you a taste of the exciting year ahead.

And if you don't . . . take a look at what you're missing. It should be all the persuasion you need!

Now read on...the quantum leap into serious computing starts here.



Nigel Searle, Managing Director, Sinclair Research Limited.

# New QL Software

## Utilities, languages, games and business packages...with more on the way!

Two things are now certain about QL software. First, there's going to be plenty of it. And second, it's going to set completely new standards for microcomputers...

At the moment, there are well over 100 software programs in development. And the first software releases, shown here, demonstrate how exceptional the best QL software will be.

The QL already has five languages, superb programs for software developers, a top quality accounting package and in QL Chess it has its first game.

# QLUB: 10,000 members and growing!

QLUB is the special Users Bureau for Sinclair QL owners. There are now well over 10,000 QLUB members, and membership is growing all the time.

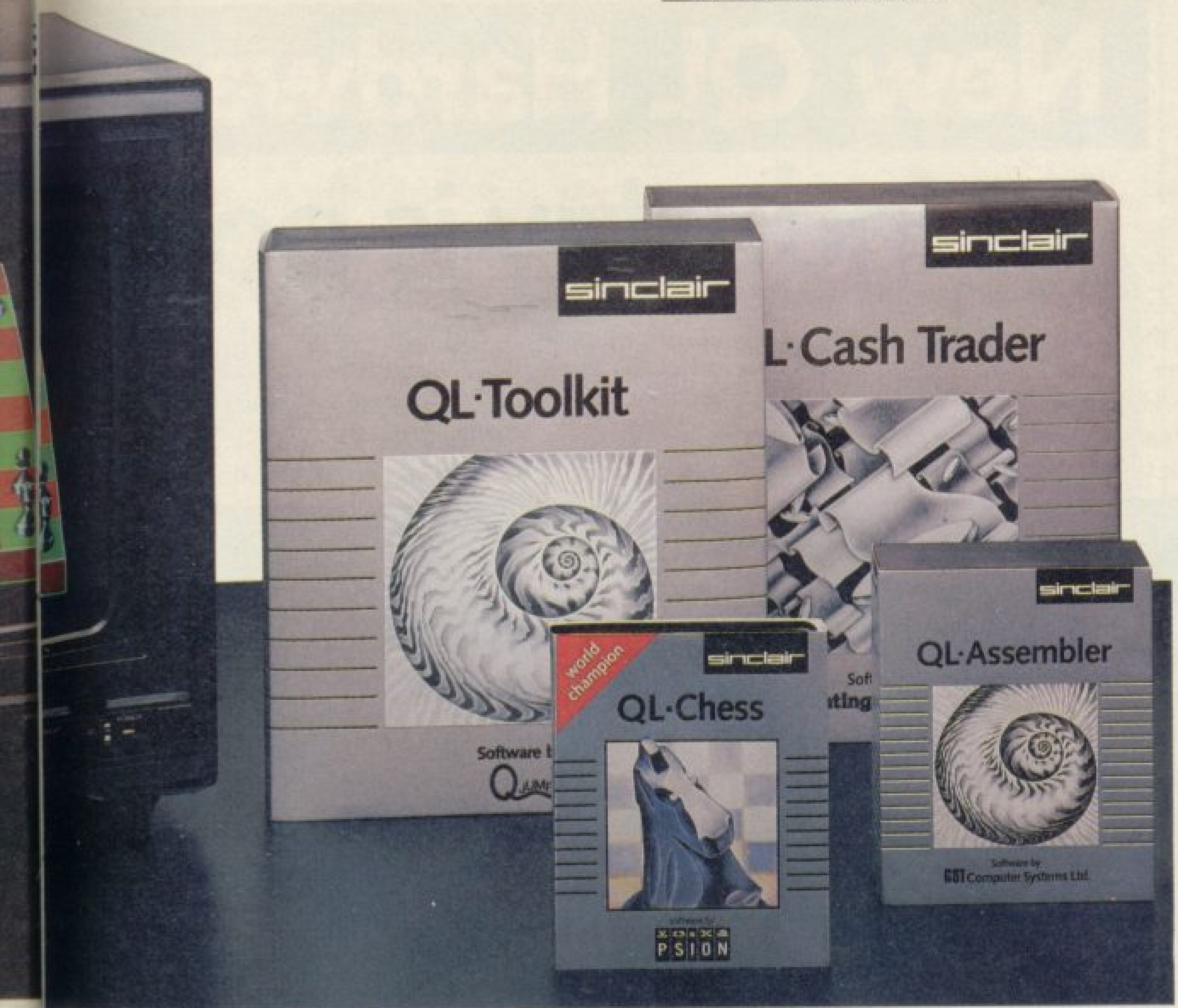
For their annual subscription of £35, QLUB members are enjoying a whole range of information and advisory services, exclusive offers and special discounts.

One of the most important QLUB benefits is the special news magazine, appearing six times a year. The magazine provides a forum for QL owners to exchange views and keep in touch with all the latest developments.

Each issue is packed with updates on QL hardware and software, tips on applying the four QL Programs, and news of how other people are using the QL. QLUB members also receive a range of special discounts, with savings of at least 20% on selected software products.

**Current special offers include:**
**QL Chess for £14.95**
**QL Toolkit for £19.95**
**QL Assembler for £31.95**
**QL Cash Trader for £54.95**
**Special subscription rates for Personal Computer News and QL User.**

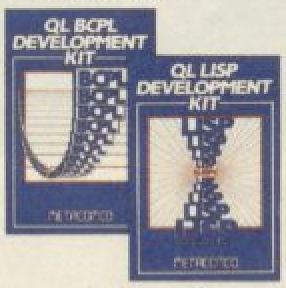





## The multilingual Sinclair QL

**BCPL** – a forerunner of C, BCPL has been described as a systems programmer's delight. In the words of QL User, this compiler is a 'brilliant compromise between a high-level language and a low-level systems language'. Whilst not for beginners, this is an essential buy for anyone with a good knowledge of systems programming. Complete with manual.
**Available from**
**Metacomco – £59.95.**
**Tel: 0272 428781.**

**LISP** – already well-known for its artificial intelligence applications, LISP is a powerful and versatile language. This is a sophisticated implementation of LISP, by one of its leading exponents, Dr Arthur Norman. This package features full QL graphics, and a full manual is supplied.
**Available from**
**Metacomco – £59.95.**
**Tel: 0272 428781.**




**Pascal** – probably the most popular high-level language of all. Pascal is particularly well-suited to structured programming, sophisticated data manipulation and algorithmic problems. Pascal interpreter complete with 87-page manual.
**Available from**
**Computer One – £39.95.**
**Tel: 0223 862616.**




**Forth** – this 'new generation' language is proving both popular and easy to learn. The program provides a full implementation of the latest Forth 83 standard with graphics and sound extension.
**Available from**
**Computer One – £29.95.**
**Tel: 0223 862616.**

**APL** – the compact mathematics-based interpreted language designed for scientists and mathematicians.

APL keyword interpreter complete with manual.
**Available from**
**MicroAPL – £99.95.**
**Tel: 01-622 0395.**

## Programmer's packs

**QL Assembler** – two programs operating in tandem. The first is a full-screen editor for creating and altering program files. The second, a Motorola-format compatible 68000 assembler which converts source files written in M68000 assembly language into machine code files which can run on the QL.

Both assembler and editor are written in machine code and can be multi-tasked with SuperBASIC, so you can switch between editor, assembler and SuperBASIC instantly.
**Written by GST Computer Systems – £39.95.***

**QL Toolkit** – a programmer's toolkit with over 70 programs. and extensions to SuperBASIC. Most are linked to SuperBASIC initially and can then be used from commands or from within a program. Enhancements include printer spooling (print a file while running a SuperBASIC program); improved file access (with full random input/output command); job control (allows management of multi-tasking programs including the ability to display, alter priorities, and delete jobs from the QL); and SuperBASIC screen editor.
**Written by Q Jump – £24.95.***

## World-beating chess!

**QL Chess** – fresh from its victory at the World Microcomputer Chess Championship. This program sets a completely new standard for games software.

There's a high resolution display, animated 3-D graphics, and 28 levels of play from novice to champion. Features include an openings book of nearly 4000 moves, HINT and TAKEBACK functions that help you learn from your mistakes, and the option to play a human opponent or the computer.
**Written by Psion – £19.95.***

## Software at work

**QL Touch 'n' Go** – a unique approach to learning touch-typing skills. The program is designed to give you mastery of the standard QWERTY keyboard in just 24 hours. With practice, you should soon reach 40 words per minute, with over 95% accuracy.
**Written by Harcourt – £24.95.***

**QL Cash Trader** – a unique computerised book-keeping system for small businesses. The program provides a complete course in the principles of accountancy, and goes on to become an essential aid in the day-to-day running of a business. Complete with comprehensive manual.
**Written by Accountancy Software of Torquay – £69.95.***

***This title is available from Sinclair Research on 0276 686100, and selected Sinclair stockists nationwide.**

## Psion trouble-shooting service

All QLUB members can obtain special assistance from Psion on using the QL Quill, Abacus, Archive and Easel programs supplied with the computer. Psion will normally answer any queries within 48 hours.

## Free updates

QLUB members will also receive one free update of each of the four QL Programs – incorporating many new developments.

# New QL Hardware
# An industry is born

From the moment of its launch, the revolutionary QL attracted massive interest from all quarters.

In one area, the interest quickly turned to action, as high-tech hardware manufacturers realised the immense potential of the QL for vast expansion, for system development and for widespread networking. Already the list of peripherals for the QL is very exciting – and lengthening by the day!

Here, we've covered many of the latest, most important developments.

As more appear, be sure to keep in touch with QL News!



## The dedicated Sinclair Vision QL monitor

Once you see the incredible graphics capabilities of the QL you may decide an ordinary TV just can't do them justice.

If that's the case, a high-resolution monitor is needed. (And if you're creating presentation-quality charts, for example, it's quite essential.)

The new Vision QL monitor is specially designed for the computer by Kaga Electronics, with full support from Sinclair Research.

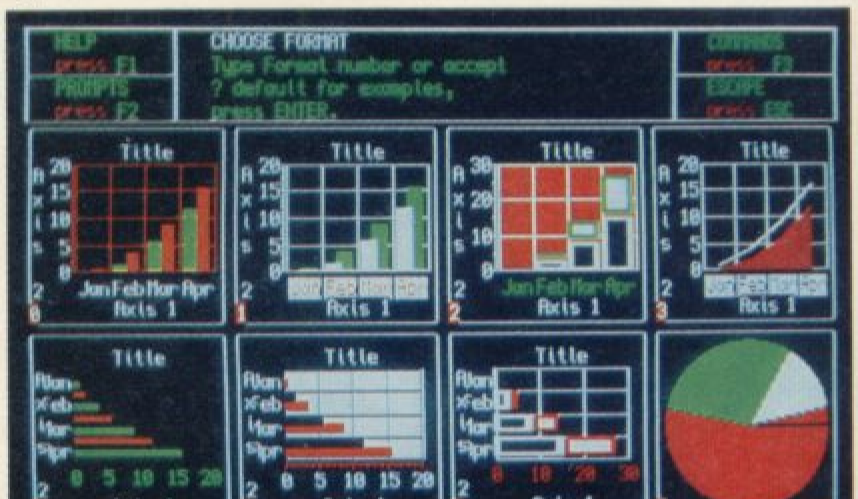
So it exploits the QL's maximum 512 x 256 pixel resolution to the full, with a pin-sharp 85 column display.

It's also specially styled to suit the QL – in looks, and in use. There's a 12" non-glare tube, and etched screen to diffuse reflections.

So the display is bright, sharp, *much* easier to look at . . . and invaluable for those late-night programming sessions!

And like the QL, the Vision monitor is designed with space in mind: it has a compact footprint of just 12½" by 15" – no more than a typical portable typewriter.

It's available from MBS Data Efficiency on 0442 60155 and selected Sinclair stockists.




The QL's superb graphics capabilities – as demonstrated by the Sinclair Vision QL monitor.

ADVERTISEMENT

# Microdrive cartridges. Now only £1.99!

Microdrive cartridges are the QL's own unique storage media. Each stores up to 100K of information, on a cartridge no bigger than a matchbox!

Over 500,000 cartridges are now being used throughout Britain. And QL Microdrives themselves are standard equipment on the new ICL One Per Desk micro.

Now there's more good news for QL enthusiasts: from February 1, the cost of QL Microdrive cartridges are down from £4.95 to £1.99 each!




Sinclair Microdrive cartridges – up to 100K of programs and data on a medium so compact you can pop it into your pocket.

## Powerful hard-disk system

For the QL business user, the new Firefly QL Winchester disk will boost the QL's power in one huge leap.

Designed by Quest, it uses CP/M and offers all the benefits of Winchester technology: fast access, reliability, compact size and quiet operation.

With 7.5 Mb storage, the Quest Firefly is ideal for large databases such as stock or customer lists. And at under £1,200, it represents exceptional value for money.

The Firefly will be available very shortly from Quest on 04215 66488.



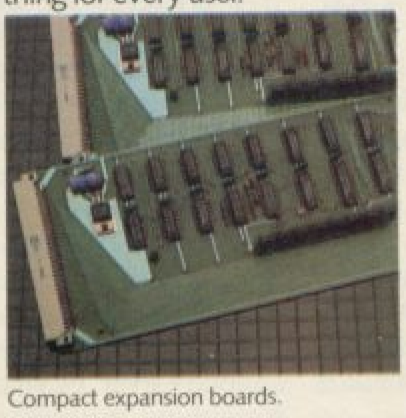
Winchester hard disk drives supplement your QL's built-in mass storage.

## Expansion boards for up to 4 times more memory!

Also from Quest, a simple and inexpensive way to expand the QL's RAM: with memory expansion boards.

These compact units connect to the standard QL expansion port, using the QL's internal power source or, for larger boards, an external power source.

The units range from 64K and 128K RAM boards to massively powerful 256K and 512K RAM boards, so there's something for every user.



Compact expansion boards.

Prices start at £117, and the 512K board is a very cost-effective investment at just £587.

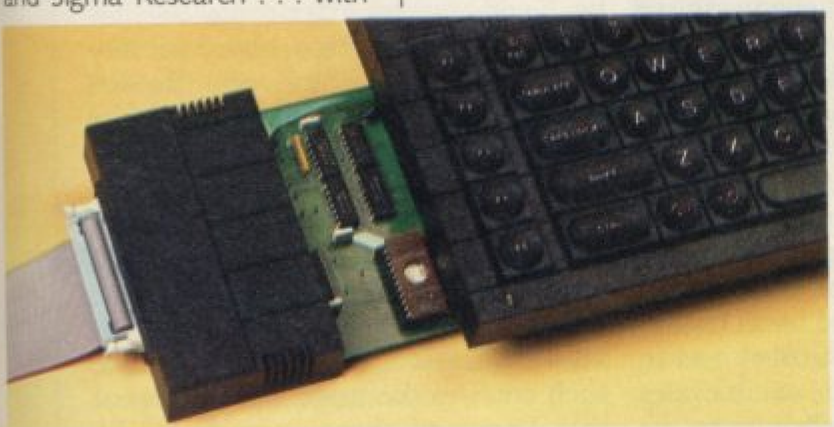
With affordable memory like this, the QL is more than a match for any other micro under £2,000!

## Interface options

The QL comes complete with two built-in RS-232C interfaces.

In addition, interfaces for Centronics printers are widely available from manufacturers such as CST, Miracle Systems and Sigma Research . . . with prices from only £35.

And that's just the beginning. For attaching scientific and laboratory instruments to the QL, CST even offer an IEEE-488 interface, which can handle up to 16 connected devices simultaneously!



A Centronics interface slips discreetly into place.

**Where to find the QL.** The Sinclair QL is available at selected branches of Dixons, W H Smith, John Lewis Partnership, Currys, Greens in Debenhams and Ultimate, and larger branches of Boots, John Menzies and specialist computer stores nationwide.



# The spec behind the spectacle

**CPU – Central Processing Unit**
Fast, powerful Motorola 68008 chip. A second processor, an Intel 8049, controls the keyboard, generates the sound, and acts as an RS-232C receiver.

**RAM**
128K. Now expandable to 640K.

**ROM**
48K.

**Operating system**
Qdos – revolutionary single-user, multi-tasking, windowing operating system.

**Storage**
Twin built-in QL Microdrives. Up to 100K storage each – transfer rate, up to 15K per second.

**Keyboard**
Full moving 65-key QWERTY, five function keys, four cursor keys.

**Language**
Sinclair structured SuperBASIC.

**Application software**
QL Quill – word processor
QL Abacus – spreadsheet
QL Easel – graphics
QL Archive – database
All four packages supplied with the QL.

**Interfaces**
Two serial RS-232C interfaces, Microdrive expansion port (up to 6 may be added), ROM cartridge port, local area network, 2 joystick ports, RGB monitor and TV output.

**Text screen**
Various modes – up to 85 columns by 25 rows on monitor. On TV, up to 60 columns.

**Graphics resolution**
512 x 256 pixels (four colour),
256 x 256 pixels (eight colour).

**Sinclair Research Ltd**
Camberley, Surrey, GU15 3BR.
Tel: Camberley (0276) 686100.

sinclair



The Sinclair C5:
Is it reliable?
Is it even safe?
Chris Bourne on
Clive's dream car

# PEDAL-POWER THE HI-TECH




THE SINCLAIR C5, a 99lb battery-powered, one-seater tricycle with a white plastic body, seems set to create more noise in the motoring world than John De Lorean and the BL Maestro rolled into one.

There was much advance speculation about the machine, and Sinclair staff remained tight-lipped to the bitter end. A few spectacular leaks proved more or less accurate, but the extent of the marketing support from such worthies as Woolworth and the Electricity Council was a surprise.

The original design was expected to involve radically new battery technology, as a previous problem facing electric car designers had been the construction of a battery powerful enough to drive the car but light enough for the car to carry.

The C5 does not provide anything new in that area, but uses a 33lb lead-acid battery, based on existing car batteries. When you consider that the rest of the machine weighs only twice as much, you realise the sacrifice a conventional battery entails.

Unable to produce a radically new battery design, the designers chose to create a lightweight vehicle to suit existing technology. With the aid of Lotus, the British sports car specialists, a sleek body was designed. Steering is through handlebars situated beneath the thighs, with brakes similar to cycle brakes. The accelerator is a button on the handlebars, and there is no reverse gear.

In order to get the thing moving, pedals are provided, but on a dry level start we found that only a couple of revolutions were needed before the motor cut in. The pedals are also required when driving up steep hills. The motor delivers a maximum speed of 15mph. The battery has a range of 20 miles, according to Sinclair Vehicles, the company set up to handle the manufacture of the buggy.

Overall, it measures 2′6″ wide, 2′6″ high, and 6′6″ long. There is a boot of one cubic foot capacity, enough for a very small shopping load, a few school textbooks or a flimsy party costume. We were unable to squeeze an executive briefcase in. Two lights, one at the back and one at the front, along with a futuristic Liquid Crystal Display, complete the basic package, at £399 mail order in a tough cardboard box. It may be more fun than a QL, but is it safer?

Taking advantage of a change in the law in 1983 designed to help disabled drivers and milk float manufacturers, the C5 was carefully designed so that anybody over 14 years old could drive it, without insurance, driving licence, road tax or crash helmet, and even if they had already been disqualified from driving a car in the courts. It is classed as a pedal-assisted tricycle, and it is probably fairest to think of it as an alternative to mopeds or bicycles rather than a serious challenger to the conventional car.

Safety organisations have already voiced concern about the C5. The Royal Society for the Prevention of Accidents — RoSPA — was commissioned by Sinclair Vehicles to write a booklet on driving the machine safely. That booklet, provided with the C5, was compiled by Howard Boyd, RoSPA's National Cycling Officer. It warns of the danger caused by the low height of the machine, which means lorry-drivers and less alert car drivers may have difficulty spotting it.

If you buy the C5 in its basic form, you will not get wing mirrors, indicators, or a horn. Those accessories may be bought as an extra from Sinclair Vehicles, along with a high visibility mast to attach to the car. RoSPA regards such items as essential for safety, particularly the mast. Those cost £143, and together with insurance, spare battery and delivery the full cost of the C5 is around £600, rather more than the £399 quoted.

Bill Nichols of Sinclair Research says it was never the intention to hide such costs to the user, and points out that "none of those items is legally required." However, the issue at stake is not the legality of the machine, or even its structural stability. "We are



# BEHIND TRIKE






satisfied that it is not inherently unsafe" says Geoff Large, RoSPA's assistant director for Road Safety, with a subtle use of the double negative.

What is causing the most concern is how well the C5 will fit in with current traffic conditions, and whether conventional motorists will treat C5 drivers with due respect on the roads. There are training schemes for cyclists and motorcyclists, and saturation advertising to warn motorists of the problems faced by cyclists. So far there is nothing similar to support the vulnerable C5 enthusiast.

The first people to test the C5 in normal traffic will be the customers. Because of the secrecy surrounding the production of the machine, the only tests conducted on public roads have been held at night with little traffic about. That is a completely different environment to a busy high street full of frustrated motorists, pick-up trucks, vans, buses and taxis.

In spite of reservations, RoSPA does not believe the C5 should be banned. Geoff Large feels that, with the visibility mast, the C5 scores over bicycles for its stability. "If people change from cars to C5s that would be a positive gain for road safety in reducing the traffic load," he says, "but as an alternative to public transport there would be a problem, as there would be no change in the growth of car owners."

Of the design itself, regardless of safety considerations, reaction has been kinder. We found it great fun to drive, and the low height gives an added impression of exhilarating speed. According to Sir Clive, the polypropylene body is incredibly tough. "Hit it with enormous force," he says, "and it just bounces back".

Although the C5 performed well on the level concrete of Alexandra Palace, test models driven at the launch expired halfway up Muswell Hill, and there were reports of at least one early C5 pioneer finding himself stranded four miles out of Streatham on his way to work. The problem appears to be with the battery. Does it work or not?

There are three factors involved, according to Bill Nichols, which can make the battery's performance seem less than impressive. Firstly, when you buy a C5 you must recharge the battery before you set off. There is considerable power loss if it is left sitting around for a long period of time. It takes about eight hours to recharge on the domestic mains, so serious owners will want at least two batteries.

Secondly, the C5 requires a new technique of driving, dubbed 'push and coast'. The temptation is to keep your finger firmly on the accelerator button at all times, but that drains the power swiftly. What you should do is give a burst of power, then coast along for a bit, then give another burst. Bill Nichols claims effective use of that technique may push the range well beyond the stated twenty miles. Of course, if you don't use the motor at all, you can keep going until your pedals drop off.

The third point, not mentioned in the brochure, is that of weather. Apparently the battery loses 8-10 per cent of its efficiency at zero degrees, and more below freezing. "That was a problem in launching it at this time of year" says Nichols.

While the pundits mutter, the public appears to be ready to give it a go. Sales in the first week were fast approaching 1000, according to Nichols, with only "four or five complaints so far." At present it is only available mail-order, but Sinclair says it will be appearing in high street electrical stores later in the year. There is a possibility of Woolworth stocking it. It is already on view in selected Electricity Council showrooms, but not for sale or trial.

It is right and proper that a machine which can be driven by an untrained fourteen-year-old should be subjected to as severe a criticism as can be justified. Design faults in a Spectrum are not going to kill anybody: design faults in a car might well do so.

But it is worth remembering that Sir Clive has yet again demonstrated his commitment to entrepreneurial risk-taking in no uncertain fashion. Whether the C5 will catch on, either as a toy for rich kids who don't mind looking silly, a novelty at amusement parks, a motorised golf caddy or a genuine new means of urban transport, does not affect that fact.

Sir Clive may seem an unlikely candidate for the Henry Ford of the 80s but if nobody ever took those risks, we would still be riding horses. There is a lot to praise in the C5, and many questions which only experience can answer in full. In the meantime, you have to admire his nerve.



# A wealth of Peripherals for your Spectrum!

By RICK BRAVO

Since the 48K Spectrum was launched the opportunities it offered has attracted peripheral manufacturers throughout the world.

One of these manufacturers was bound to emerge as the "brand leader" and in the case of the Spectrum this turned out to be DK'tronics. The company is based in Saffron Walden in Essex and proudly boasts a history dating back to the ZX80. All the company's products are manufactured in England at their own factory and they have now established themselves as world leaders, exporting to over 30 countries.

Below you will find a review of their range which now includes over 16 products, all of which are available for the Spectrum and Spectrum + models.

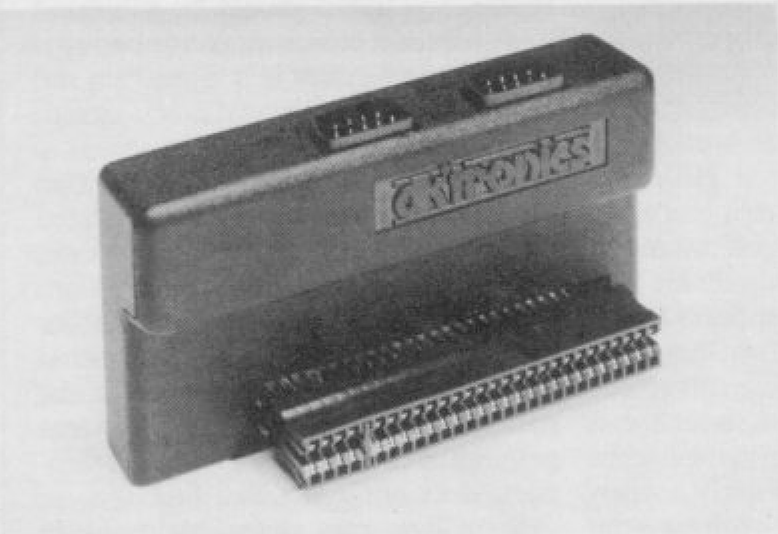
## Keyboard



The DK Microdrive Compatible Keyboard is the best selling keyboard in the world and is now used by around 10% of all U.K. Spectrum owners. It is microdrive compatible and offers more key functions than any other keyboard in its price range. The stepped keys and space bar make it even easier to use. It is constructed from high density black ABS and has 52 keys and a full width space bar. A separate numeric keypad of 12 red keys including single entry 'delete' plus single entry 'decimal point' facilitate fast numeric data entry.

From good computer shops everywhere at only £37.50 or direct from DK'tronics, add £1.50 post & packing.

## Dual Port



The first port simulates 6,7,8,9, & 0 Keys. The second port simulates in (31) command.

The port will accept any Atari style joystick.

It will run any software. That is:-

(a) Using Keys 6,7,8,9 & 0.

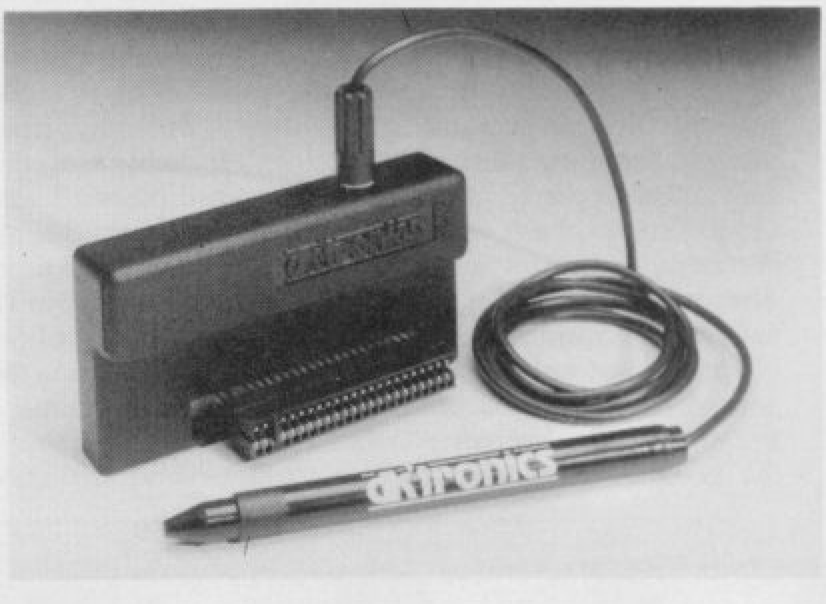
(b) Having redefinable key instructions.

(c) Using in (31) (i.e. Kempston).

This Dual Port interface interconnects with the existing range of DK'tronics products to form the most comprehensive range of Spectrum peripherals available from any manufacturer.

From good computer shops everywhere at only £13.00 or direct from DK'tronics, add £1.50 post & packing.

## Light Pen



This highly successful Light Pen for the Sinclair Spectrum plugs neatly onto the rear of the Computer or the rear of the printer connector. The operating software now runs faster and supports 16 pre-defined instructions. You can change all the colours (Border, Paper, Ink), draw circles, arcs, boxes, lines and insert text onto the screen (ideal for diagrams etc.) Save & load completed or partly completed screens onto or from the tape.

There are also features to draw Free Hand and animate on the 48K Spectrum, you can retain and animate 5 screens.

You can also use the machine code on its own in your own programs for selecting out of a menu, playing games etc. All entry points necessary are given. The Pen works down to pixel level with pixel accuracy.

From good computer shops everywhere at only £19.95 or direct from DK'tronics, add £1.50 post & packing.

From **dk'tronics**® Saffron Walden, Essex CB11 3AQ tel:(0799) 26350

## 3 Channel Sound Synthesizer

Any microcomputer is capable of manufacturing sound, however, in order to produce a single octave 'C' note with a frequency of 8372Hz the signal needs attention over 16,000 times per second.

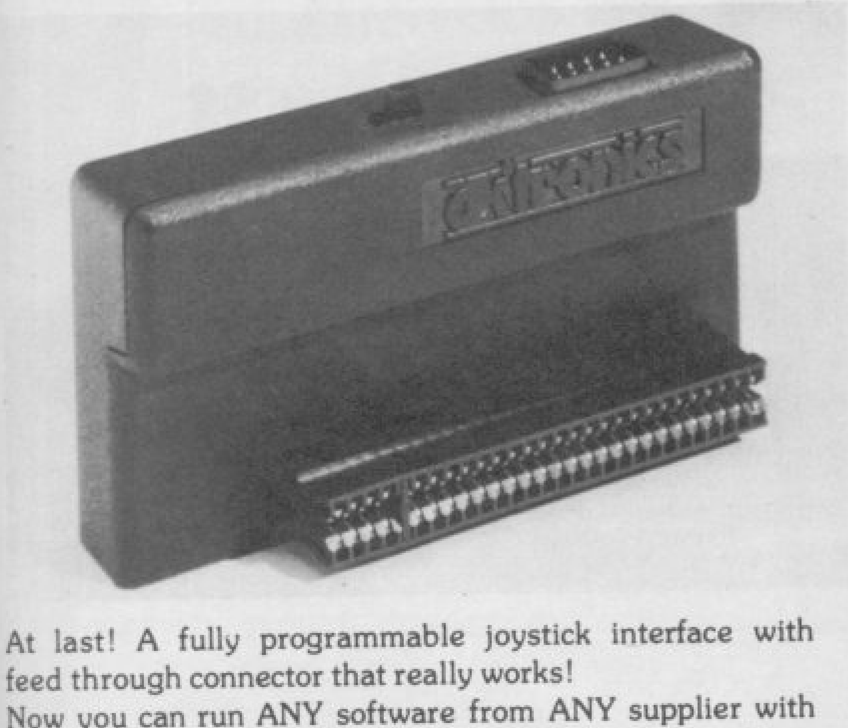
To produce software capable of perfoming just this one task would be difficult if not impossible, especially when you consider that to produce arcade type sound effects requires even greater attention.

The production of these sound effects without the constant attention of the processor is now possible thanks to the AY Sound Chip, its flexibility makes it essential for a wide range of applications including music synthesis and sound effects generation, continuing the monitoring and production of sound after the initial command.

More often than not realistic sounds require more than one effect and this function is provided by 3 independently controlled channels, as an example compare the sound produced by the single note of 'C'with that produced by the chord 'C' and you will know just what I mean, likewise producing the sound of an explosion using all 3 channels gives games a totally new dimension.

Add to this the ability to alter the pitch tone and shape of the sound you have produced and it's flexibility is unlimited. In simple terms, imagine the note you have produced as a calm sea, by altering the pitch and shape you can produce waves, the top of the wave corresponds with the maximum volume and pitch of the note, which like the wave itself rises and falls.

## Programmable




At last! A fully programmable joystick interface with feed through connector that really works!

Now you can run ANY software from ANY supplier with the DK'tronics fully programmable joystick interface. It comes complete with machine code software and can be programmed in seconds to give full 8 directional joystick movements plus five capabilities and will accept any Atari/Quickshot type joystick. A catalogue is now available showing the full range of products available from DK'tronics the world's leading Spectrum peripheral manufacturer. The through connector enables other add-ons to be plugged into the rear.

From good computer shops everywhere at only £22.95 or direct from DK'tronics, add £1.50 post & packing.



## Speech Synthesizer

The speech synthesizer uses the popular SL0/256 speech chip and has an almost infinite vocabulary. It is supplied with a text to speech converter for ease of speech output creation. Everything you wish to be spoken is entered in normal English, without special control codes or characters, it is therefore extremely easy to use. The voicing of the words is completely user transparent and the computer can carry on its normal running of a program while the speech chip is talking.

Although there are only 26 letters in the alphabet, letters have a totally different sound when used in different words. For example, the "a" in Hay is much longer and softer than in Hat. When you speak you automatically make adjustments because you know just how a word should sound. Not quite so easy with a computer. After looking at other speech synthesizers we decided that it was essential that the DK'tronics Spectrum Speech would offer a simple system that would enable the user to produce realistic speech that was instantly recognisable.

The solution to the problem was extremely complicated, it required hours of programming to enable the computer to look at the individual letters that make up each word and compare their relative position to each other before deciding on the appropriate sound.

I consider this to be the best Spectrum Speech Synthesizer on the market. From good computer shops everywhere at only £24.95 or direct from DK'tronics, add £1.50 post & packing.

## Centronics

The new Dk'tronics Parallel Centronics Interface will link your Spectrum to any printer with a standard centronics input. As the choice is vast, you can select the printer exactly suited to your needs.

Features of the interface include: Runs all parrallel centronics type printers: Controlling software fully relocatable; Interfaces with any software using the printer channel e.g. Tasword Dev Pack etc; LList Lprint recognised. High res screen dumps; All control codes allowed through to printer; Fully microdrive compatible.

Supplied with full instructions and controlling software. From good computer shops everywhere and sensibly priced at only £39.95 or direct from DK'tronics, add £1.50 post & packing.

# SAVE THE MOLE!

## *Win the latest Monty game PLUS membership to the Gremlin Gang*



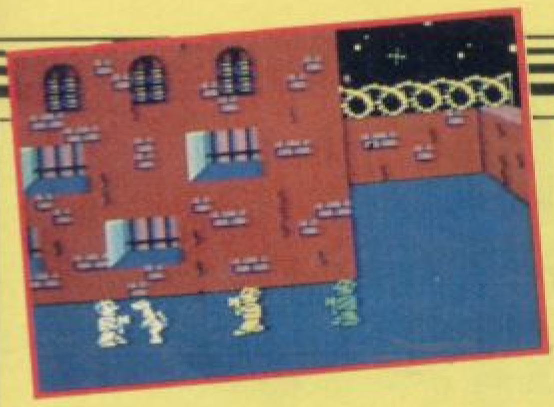

MONTY, the hero of the best-selling **Wanted: Monty Mole,** is languishing in jail. The sequel, **Monty is Innocent,** casts you in the role of Monty's friend Sam Stoat. You have to rescue Monty, who has been unfairly convicted of borrowing a bucket of coal.

A 48-screen arcade adventure, **Monty is Innocent** requires you to break into Scudmore prison, find the cell holding Monty — it changes every game — get the correct key from the governor's office and escape with your black velvet friend. Easy? It might have been, but for all the horrors you will meet along the way, such as skeletons, the mad axeman, or the dead-end solitary confinement cells. You will also need to find guns and invisibility potions along the way. After a few hours of **Monty is Innocent,** Wormwood Scrubs can hold no terrors for anybody.

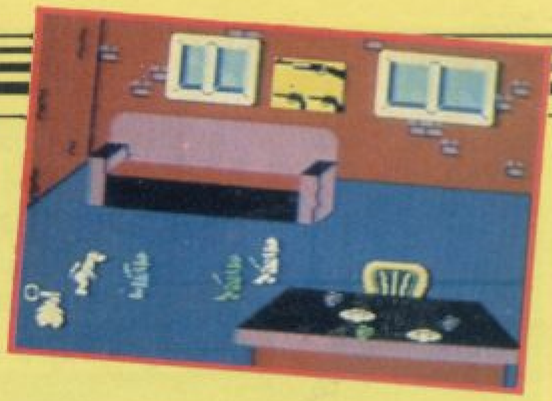
Gremlin Graphics is providing 50 copies of the game for the lucky readers who win our equally fiendish competition. As a bonus, the first 10 will also be made members of the Gremlin Gang, the company's software club which provides a newsletter about Gremlin Graphics, the opportunity to swap ideas with other members, and exclusive club offers. Club members will also get a special certificate, the amazing Gremlin Gang sweatshirt, and posters of **Wanted: Monty Mole** and **Suicide Express.**







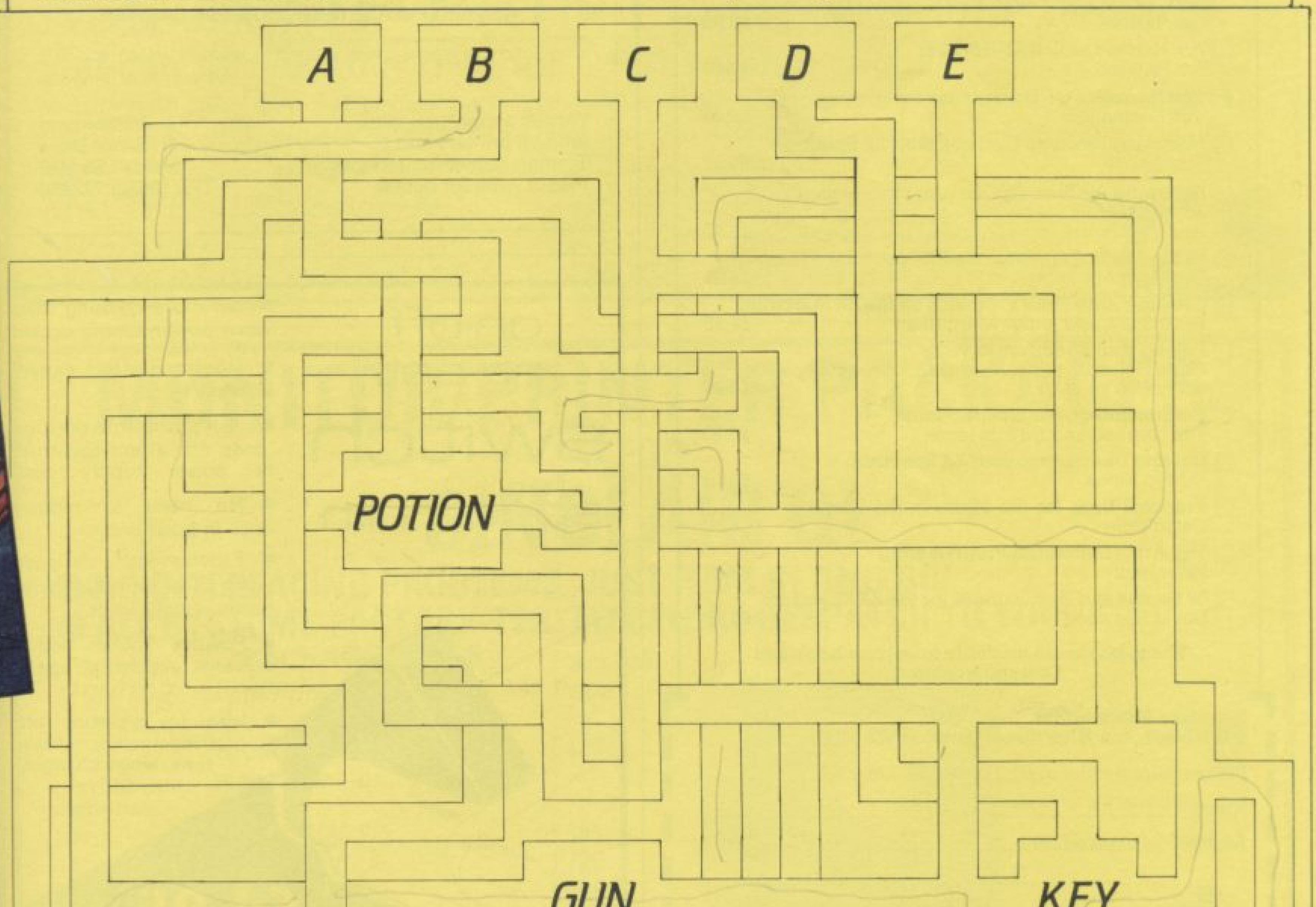


All you have to do to win **Monty is Innocent** is solve the maze opposite. After all, no self-respecting Molebuster would attempt a jailbreak without a bit of practice first. There are five cells — A, B, C, D and E — and Monty is in one of them. You must also pick up one of each object — potion, gun and key — as you go. Beware of the secret alarm system: it will be activated as soon as you walk down a path already travelled. So visit the gun, potion and key once only, and do not pass the same way twice.

There is only one cell you can reach while obeying those rules, and luckily that is the one holding Monty. When you have discovered the route, write the letter of the cell on a postcard along with the objects *in the order in which you found them.* You must have everything correct in order to win.

Postcards must reach us by Friday March 22, 1985. Address your entry to: Monty Competition, *Sinclair User*, Priory Court, 30-32 Farringdon Lane, London EC1R 3AU. Make sure you include your name, address and telephone number on the postcard. The first 50 correct entries selected after the closing date will decide the winners.

Employees of EMAP and Gremlin Graphics, their friends and associates, are not allowed to enter the competition.



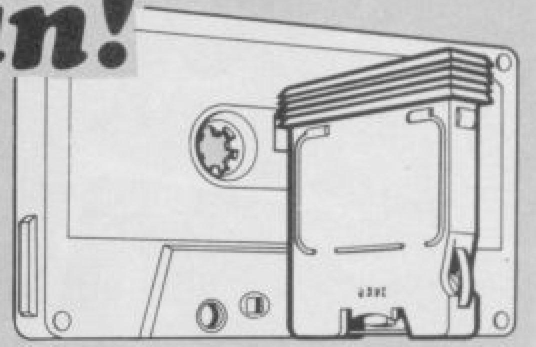
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*(Illustrated: QL with Microvitec 1451DQ3 and Epson RX80F/T)*



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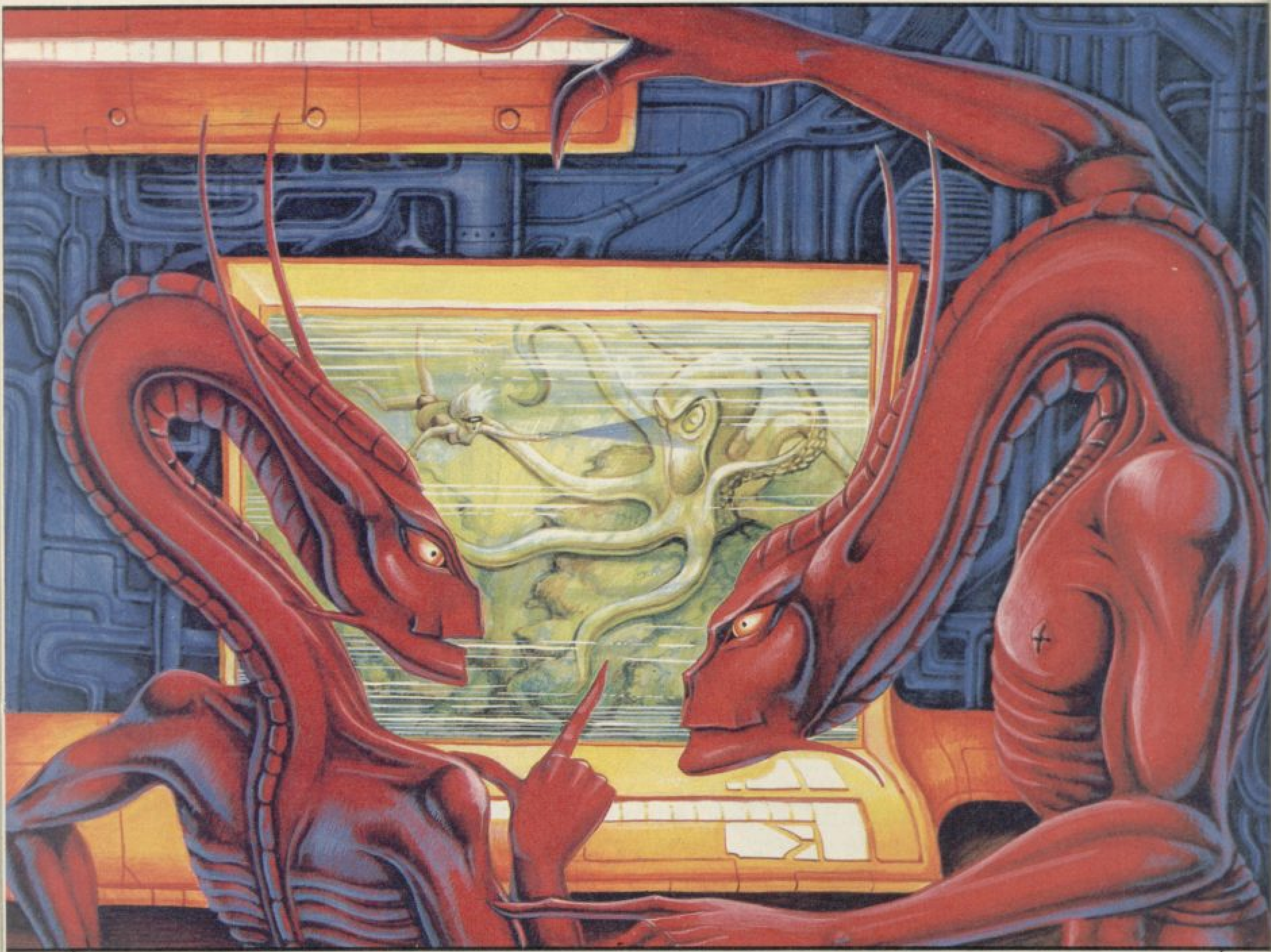
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Please rush me details of the **"ENTER the BEYOND"** Software Club . . . ☐



# Giving a monster a mind of its own

## Produce intelligent characters with the second part of John Gilbert's series

THE STORY so far. Last month we looked at how to plan an artificially intelligent adventure, plotting storylines and mapping them into Basic routines.

Our example plot concerned the theft of the Crysan clock, an atomic timepiece which keeps the universe running, from a marine institute off the coast of Florida.

Kagan, the moderator of the institute, and two researchers, Marla and Morris, board a sea launch and search for the yacht in which the purloiners escape.

This month we consider the attributes used to build artificially intelligent characters and see how they can be used to create life on the Spectrum and QL.

Character construction consists of three phases or parts. Those are conception, modulation and interaction. The last two are inter-connected. Interaction, which includes communication, will inevitably change a character's actions — the province of modulation. Any change in attitude, resulting from an alteration to a character's attributes in the modulation phase, produces changes in the way in which characters see the world and behave towards others.

One character's creation and manipulation influences the movement of other characters and objects within the adventure world. For instance, depending upon how brave a character is feeling, an object may be picked up

within the Delta Class Yacht in our adventure. If that object is taken another character may suffer because a food source or weapon is not available at the appropriate time. For that reason movement is considered as one of the main aspects of writing AI adventures and will be discussed in detail in a future article.

The process of character conception is simple to describe but can be made as complex as a planned adventure requires. We can stay on familiar ground, at least for the present, and look at the types of general characteristics used by most games and then home in on the specific requirements of The Crysan Incident.

Role-playing games, such as *Dungeons and Dragons*, all use remarkably similar attribute systems. They include Strength, Intelligence, Dexterity, PSI, and Attack Points. Strength and Intelligence show the physical well-being and mental powers of a character, while Dexterity indicates how agile he or she can be. The PSI attribute usually represents magical powers of the mind and is used in combat with demons. Attack Points are used in battle and represents the number of blows a character can receive without being injured.

You can see that such characteristics are best suited for games in which battles are the order of the day or night. They are not ideal for adventures where more subtle interaction is required. They do not describe the inner qualities of a character's persona.

In our adventure we need reactions within the characters which spring from fear, hate, pain or any of the other expressions associated with life. There are four characters involved in this month's instalment in which the research team discover the missing yacht beneath the waves.

While one of the researchers — Morris, say — remains on board the launch, the other two — Kagan and Marla — don scuba gear and plunge into the depths.

They are not prepared for what they meet — two creatures related to the squid family, Genghis and Boreel. Those are slow in body but have excellent reasoning powers, they will not engage in fighting, or continue a battle, without a good chance of winning. Behind them lies the wheelhouse door of the submerged yacht.

The general attributes which can be used for each of the characters are shown in figure one. Those marked with an 'X' will change throughout the game. The final sector of the chart shows the scales used for each attribute. Those range from −10 to +10. For instance, if Kagan's Stress mark is −5 then the next situation in which stress is involved will be handled badly by him. Mistakes will be made and strength, ego and emotion factors would be adversely affected.

| Attribute | Changeability | Range (+10/−10) |
|---|---|---|
| Emotional | X | stable/unstable |
| Stress | X | capable/incapable |
| Strength | X | strong/weak |
| Intelligence | | genius/moron |
| Ego | X | inflated/deflated |
| IQ | | high/low |

**Figure 1. General atrributes**

The key to artificial intelligence, using attributes as sensors of ability, therefore lies in the way in which each of them is inter-related with the others. Using this system no character will ever be inherently good or evil as in many other games. It should be possible to win enemies over to your side or make enemies of friends.

Although hundreds of changes may be made to character attributes during a game all of them have to be set at the start. The table containing Kagan's initial attribute levels is shown in figure two.

| Attribute | Kagan | Marla | Genghis | Boreel |
|---|---|---|---|---|
| Emotional | 5 | −2 | −3 | 2 |
| Stress | 4 | −1 | 6 | −3 |
| Strength | 3 | 2 | 4 | 4 |
| Intelligence | 7 | 6 | 6 | 6 |
| Ego | 6 | −5 | 7 | 4 |
| IQ | 6 | −6 | 3 | 6 |

**Figure 2. Character table**

Figure three is a progression of the one-character table and shows all attributes used in listing one. One array is used to store attributes for all the characters. It may seem confusing on paper but such an arrangement saves memory and is not so confusing when transferred to a program listing. You will only have one array to remember.

When creating your own characters it is helpful to use a chart such as that in figure three. You will find that when it comes to plotting the adventure you can tell at a glance how characters should react to the events and what will happen if the player-character, Kagan in this case, performs a certain action.

You could even give the player-character some autonomy where the character, and not just the player, has some say in what he or she does. That happens in listing one when Kagan may flee at the sight of a fight. Such actions are more interesting than using a lifeless puppet which exists just to move you through the game. Make a player-character rebellious and you change the nature of your games.

Once the character data has been assimilated on the chart you can start working it into your adventure. A simple scenario has been set up in listing one. Lines 100 to 180 set up the data in an array marked 'a'. As shown in line 120, there are four characters involved and six types of attributes. Line 130 sets up the data for the array between lines 190 and 220 and then lines 140 to 180 use loops to enter that data.

The brief scenario is described between lines 240 to 290. These are a temporary measure as there are better ways of creating a complete adventure and those will be discussed in a future article.

*continued on page 124*

| New type | Formula |
|---|---|
| Anger | Stress/Intelligence/Strength |
| Courage | Stress/Strength/Ego |
| Cowardice | Stress/Strength/Ego |
| Happiness | Intelligence/Stress/Ego/Strength |
| Elation | Stress/Strength/Ego |
| General characteristics are coupled to give new, more complex, characteristics. | |

**Figure 3. Creating complex attribute formulas using general attributes**

*continued from page 123*

The REM statement at line 300 introduces one of the most important parts of the listing regarding character interaction and modulation. Lines 310 to 330 look at each of the monsters and decide which, if any, guards the yacht. Ghenghis is the most powerful and holds a rusty sword which he has discovered in an old wreck. As you will see next month, Kagan or Marla can take the sword away if Genghis is confused. If, however, Genghis is not around then neither is his sword, which you may take for a blessing or a curse.

**Listing 1**

```
 100 LET c$="": LET p$="": LET n
$=""
 110 REM create attribute bank
 120 DIM a(4,6): REM (character
index, attribute index)
 130 RESTORE 190
 140 FOR k=1 TO 4
 150 FOR m=1 TO 6
 160 READ a(k,m)
 170 NEXT m
 180 NEXT k
 190 DATA 5,4,3,7,6,6: REM Kagan
 200 DATA -2,-1,2,6,-5,-6: REM M
arla
 210 DATA -3,6,4,6,7,3: REM Geng
his
 220 DATA 2,-3,4,6,4,6: REM Bore
el
 230 REM set up example scenario
 240 CLS
 250 PRINT "The murky water clea
rs as you"
 260 PRINT "and Marla travel dow
nward"
 270 PRINT "towards the dark sha
dows which"
 280 PRINT "mask the yacht which
 you have"'"picked up on your sc
anner."
 300 REM set up monsters
 310 IF a(3,2) OR a(3,3) OR a(3,
5)<-1 THEN  LET c$="Boreel": LET
 f$="one creature guards": GO TO
 340
 320 IF a(4,2) OR a(4,3) OR a(4,
5)<-1 THEN  LET c$="Genghis": LE
T f$="one creature guards": GO T
O 340
 330 IF c$="" THEN  PRINT "The y
acht looms before you, its": PRI
NT "open inviting you in": GO TO
 380
 340 REM print monsters
 350 PRINT "Soon the yacht looms
 menacingly"
 360 PRINT "in the darkness."
 370 PRINT f$;" the doorway.": G
O TO 400
 380 PRINT "You pass into the da
rkness beyond the doorway."
 390 STOP
 400 REM decide whether to fight
 410 IF a(1,2) AND a(1,3) AND a(
1,5)<-8 THEN  LET p$="Marla": LE
T n$="Kagan": GO TO 440
 420 IF a(2,2) AND a(2,3) AND a(
2,5)<-8 THEN  LET p$="Kagan": LE
T n$="Marla": GO TO 440
 430 LET p$="Kagan and Marla": S
TOP
 440 REM one runs away
 450 PRINT "The thought of a fig
ht chills ";n$;"'s"
 460 PRINT "blood."
 470 PRINT "He swims upward, bac
k to the surface,"
 480 PRINT "leaving ";p$;" to fa
ce the foe.": STOP
```

In order to see what is happening in the 'set up monsters' section it is necessary to take those lines to pieces:

310 — if Genghis has stress problems, a(3,2), or is low (−1) on the range in strength, a(3,3), or ego, a(3,5) then Genghis leaves the fighting to Boreel;

320 — the same is done for Boreel and if his stress, strength or ego tolerance is below −1 he will disappear and the name 'Ghengis' will be put in the c$ variable. The f$ variable in both lines is used later — in line 370 — where the number of monsters around the yacht is printed.

330 — if neither monster is put in c$ then you are free to enter the yacht as shown at line 380.

The monster modulation in the example is simple to follow but, as with everything else in the series, it can be as complex as you wish. You could incorporate hundreds of attributes in a massive array for hundreds of characters. Remember that the Sinclair machines do not restrict you to a limited number of conditions with an IF . . . THEN statement when using Basic.

Moving on to the next modulation routine, between lines 400 to 430, a similar procedure to that above is used for the goodies Kagan and Marla. This time we decide whether one of them acts the coward and swims away from the fight.

```
The murky water clears as you and
Marla travel downward toward the
dark shadows which mask the yacht
which you have picked up on  your
scanner.
Soon the yacht looms menacingly
in the darkness.
One creature guards the doorway
The thought of a fight chills
Kagan's blood.
He swims upward, back to the
surface, leaving Marla to face
the foe.
```

**Figure 4a**

```
The murky water clears as you
and Marla travel downward
towards the dark shadows which
mask the yacht which you have
picked up on your scanner.
Soon the yacht looms menacingly
in the darkness.
one creature guards the doorway.
```

**Figure 4b**

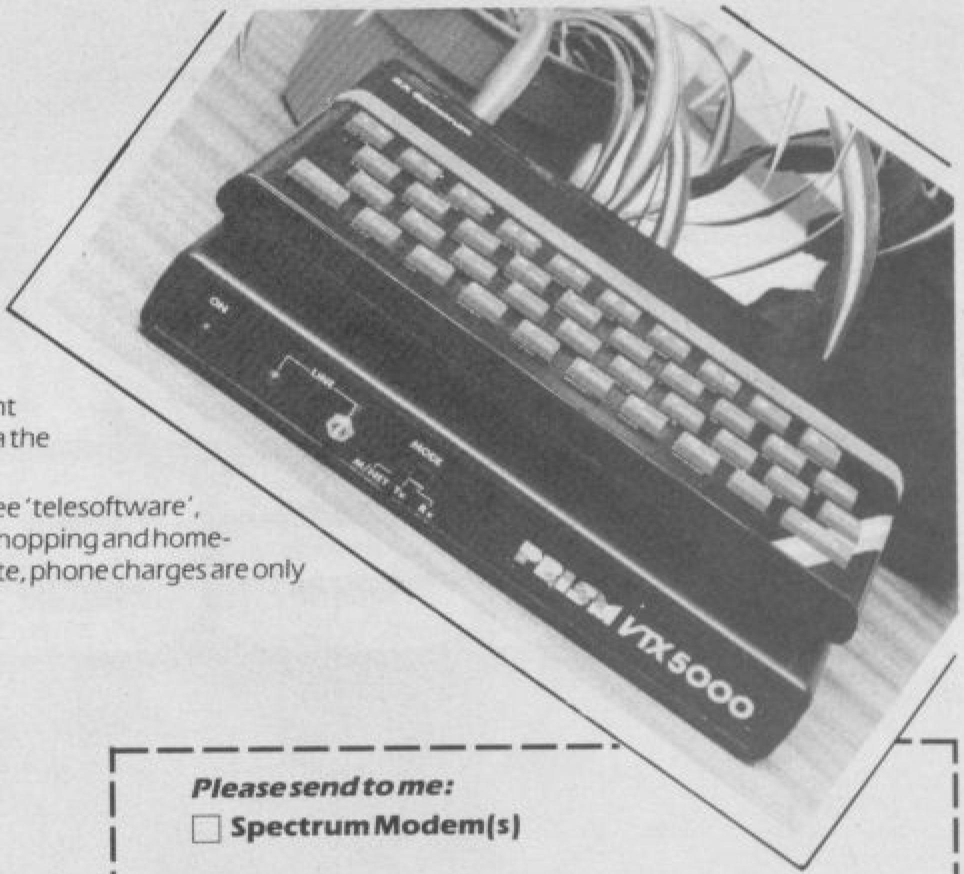
The difference lies in the type of conditional operators used. In the monster modulation, line 310 to 330, the OR operator is used to make it easy for one of the creatures to escape. In the goodie modulation phase the AND operator is used in the IF statements making it more unlikely that one would leave the scene. He would have to be low on stress, strength and ego whereas the monsters need only be low on any one factor to disappear.

The character data in the example has been fixed in an array. If you want to change the situation, shown in figure four, just change the character data between lines 190 and 220.

Next month we will consider how that data can be changed from within the program when the thieves show their hand and some character assassination takes place. We will take a closer look at that rusty sword and see how objects can change a scenario.



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# Blueprint for Spectrum memory manipulation

## Andrew Hewson investigates the memory map and puts the tick into a Spectrum screen clock using machine codes

THE INSPIRATION for the column this month comes from a letter from Peter Green of Gravesend who writes: **"I was recently given a Spectrum and I want to learn how it works. I have been reading the manual, particularly Chapter 24 on the internal workings, but it does not make much sense to me."**

A computer is a machine which is capable of storing a sequence of instructions and then executing them. To do so requires a memory in which the instructions can be stored. Most home micros contain two distinct types of memory. The first type is read-only-memory — ROM — which contains the fixed set of instructions implanted in the machine by the manufacturer. The second type is random-access-memory — RAM.

RAM is the notepad of the computer. When it is performing a task it is continually looking at what is in RAM — 'reading' from memory — and altering the contents of RAM — 'writing' to memory. The notepad is not used hapazardly — different parts of RAM are used to store different sorts of information.

A Basic program entered by the user, for example, is stored in one part of RAM, whilst the variables used by the program are stored elsewhere. In Sinclair machines, the size of the notepad is limited so the machine is careful to allocate just the right amount of space required to hold a given piece of information.

Spare space is always collected in one place so that if, for example, the user wants to add a line to his program the information in RAM is shuffled along so that some spare space is used up and just enough space is created at the location at which the line is to be added.




There are 16384 memory locations in RAM in the 16K ZX Spectrum — the 48K machine has a further 32768 locations making 49152 in all. Each location can hold a single whole number between 0 and 255 inclusive and is identified by its 'address' which is a positive whole number.

Addresses 0 to 16383 are assigned to the fixed form of memory, the ROM, and so the first address assigned to RAM is 16384. Table one shows the memory map of the Spectrum: how RAM is used starting at 16384. The display file, for example, which holds the information which is currently displayed on screen, occupies locations 16384 to 22527. The attributes, which determine the colour, brightness and so on, of the screen display, follow immediately afterwards in locations 22528 to 23295.

| Starting address or system variable name | Location of system variable | Memory contents |
|---|---|---|
| 16384 | — | display file |
| 22528 | — | attributes |
| 23296 | — | printer buffer |
| 23552 | — | system variables |
| 23734 | — | microdrive map |
| CHANS | 23631 | channel information |
| PROG | 23635 | Basic program |
| VARS | 23627 | variables |
| E-LINE | 23641 | command/line being edited |
| WORKSP | 23649 | data being INPUT |
| STKBOT | 23651 | calculator stack |
| STKEND | 23653 | spare |
| sp | — | machine stack and GOSUB stack |
| RAMTOP | 23730 | user machine code routines |
| UDG | 23675 | user-defined graphics |
| P-AMT | 23732 | end of RAM |

**Table 1. Spectrum memory map. The stack point, sp is held not in RAM but in the sp register in the Z80A microprocessor.**

The first five addresses in the first column of table one are all fixed because the display file and the attributes all occupy a fixed amount of space. The fifth area is assigned to the microdrive maps. If a microdrive is attached to the Spectrum that area contains the information on the layout of the data on the cartridge.

If a microdrive is not attached, the area is not needed in which case the sixth area, channel information, lies immediately after the fourth, the sys-

tem variables, in line with the practice of saving space wherever possible. Hence the starting address of the channel information area and all subsequent areas is not fixed but can 'float' up and down RAM.

The Spectrum keeps track of the starting address of all those areas by storing the current value of each address within the system variables area. The system variables area is the fourth in the sequence, between the printer buffer and the microdrive maps at locations 23552 to 23733. The address within the system variables area which holds the starting address of each 'floating' area is listed in column two of table one. The address of the Basic program area, for instance, is held at 23635 within the system variables area.

Referring to each system variable by the address at which it is held is rather awkward and so each is given a name — PROG in the case of the location which holds the address of the Basic program area. Those names are for the user's convenience only. They are not recognised by the Spectrum. Thus entering the line:

PRINT PROG

will cause the error message '2 Variable not found' to be PRINTed unless a Basic variable called PROG has been generated coincidentally by a program or by the user. The value of such a Basic variable would in general have nothing to do with the value of the PROG system variable.

Simon Carver of Manchester also has a Spectrum. He writes: **"Can you explain the difference between PEEK and POKE?"**

The memory map is the key to understanding the use of RAM by the Spectrum but the keys to exploring RAM are the Basic keywords, PEEK and POKE, which allow the user to look at the contents of a memory location and alter it respectively.

PEEK is a function of the form:

PEEK address

The address can be a positive whole number between 0 and 65535 or an arithmetic expression which when evaluated gives such a positive number. It is important to enclose an arithmetic expression in brackets because

PEEK 16384 + 2

is integrated as 2 added to the result of:

PEEK 16384

wheras

PEEK (16384 + 2)

is interpreted as

PEEK 16386

The value returned by the PEEK function is the number currently held at the address in question which will always be a positive whole number between 0 and 255 inclusive. It was explained above the PROG system variable is held at address 23635 but that is not strictly correct. The value of PROG, being an address in RAM, is always much larger than 255, and therefore two adjacent addresses, 23635 and 23636, are needed to hold it. The value of PROG can be PRINTed by entering:

PRINT "PROG ="; PEEK 23635 + 256 * PEEK 23636

All addresses are held in two adjacent

*continued on page 130*

**Table 2. A Spectrum routine to display minutes and seconds in the top right hand corner of the screen.**

| Decimal | | Assembly Code | Comment |
|---|---|---|---|
| 14 255 | | defw clock | define address of clock routine |
| 50 | tix | defb 50 | 50 "ticks" per second |
| 0 | mins | defb 0 | store for minutes counter |
| 0 | secs | defb 0 | store for seconds counter |
| 237 86 | stop | im 1 | reset interrupt mode 1 |
| 201 | | ret | return |
| | chars | equ 23606 | set address of character set |
| 62 254 | start | ld a,254 | beginning of routine |
| 237 71 | | ld i,a | transfer part of address to i register |
| 237 94 | | im 2 | set interrupt mode 2 |
| 201 | | ret | return |
| 229 | clock | push hl | preserve all registers on stack |
| 213 | | push de | |
| 197 | | push bc | |
| 245 | | push af | |
| 58 2 255 | | ld a,(mins) | minutes counter to a |
| 33 27 64 | | ld hl,401bh | address in display file to hl |
| 205 114 255 | | call disp | call routine to display minutes |
| 62 58 | | ld a,58 | character code for colon to a |
| 33 29 64 | | ld hl,40ldh | address in display file to hl |
| 205 91 255 | | call pchr | call routine to display colon |
| 58 3 255 | | ld a,(secs) | seconds counter to a |
| 33 30 64 | | ld hl,401eh | address in display file to hl |
| 205 114 255 | | call disp | call routine to display seconds |
| 58 1 255 | | ld a,(tix) | tick counter to a |
| 61 | | dec a | decrement tick count |
| 50 1 255 | | ld (tix),a | new count to tick store |
| 32 31 | | jr nz,exit | jump if tick count is non-zero |
| 62 50 | | ld a,50 | tick count is zero — set a to 50 |
| 50 1 255 | | ld (tix),a | and transfer to tick store |
| 58 3 255 | | ld a,(secs) | seconds counter to a |
| 60 | | inc a | increment seconds count |
| 254 60 | | cp 60 | compare to 60 |
| 32 15 | | jr nz,two | jump if less than 60 |
| 58 2 255 | | ld a,(mins) | seconds equal 60 — |
| | | | load a with minutes |
| 60 | | inc a | increment minutes |
| 254 60 | | cp 60 | compare with 60 |
| 32 2 | | jr nz,one | jump if less than 60 |
| 62 0 | | ld a,0 | minutes equal 60 — load a with 0 |
| 50 2 255 | one | ld (mins),a | set new minutes count |
| 62 0 | | ld a,0 | load a with 0 |
| 50 3 255 | two | ld (secs),a | set new seconds count |

| Decimal | | Assembly Code | Comment |
|---|---|---|---|
| 241 | exit | pop af | restsore all registers from stack |
| 193 | | pop bc | |
| 209 | | pop de | |
| 225 | | pop hl | |
| 195 56 0 | | jp 56 | return via normal interrupt routine |
| 229 | pchr | push hl | preserve hl |
| 42 54 92 | | ld hl,(chars) | character table address to hl |
| 214 32 | | sub 32 | subtract 32 from character code |
| 135 | | add a,a | double code |
| 135 | | add a,a | double code |
| 135 | | add a,a | double code |
| 95 | | ld e,a | calculate address of character in table |
| 22 1 | | ld d,1 | |
| 25 | | add hl,de | |
| 6 8 | | ld b,8 | print each eighth of |
| | | | character in turn |
| 209 | | pop de | restore hl to de |
| 126 | zero | ld a,(hl) | load eighth into a |
| 35 | | inc hl | increment pointer |
| 18 | | ld (de),a | post eighth to display |
| 20 | | inc d | increment display pointer |
| 16 250 | | djnz zero | jump back for next eighth |
| 201 | | ret | end of sub-routine |
| 205 135 255 | disp | call cvrt | call conversion routine |
| 122 | | ld a,d | transfer tens column to a |
| 198 48 | | add 48 | add base code |
| 213 | | push de | preserve de and hl |
| 229 | | push hl | |
| 205 91 255 | | call pchr | call routine to print tens character |
| 225 | | pop hl | restore hl |
| 35 | | inc hl | increment hl |
| 209 | | pop de | restore de |
| 123 | | ld a,e | transfer units column to a |
| 198 48 | | add 48 | add base code |
| 205 91 255 | | call pchr | call routine to print units character |
| 201 | | ret | end of sub-routine |
| 22 255 | cvrt | ld d, 255 | load d with 255 |
| 20 | three | inc d | increment d |
| 214 10 | | sub 10 | subtract 10 from a |
| 48 251 | | jr nc,three | jump if positive |
| 198 10 | | add 10 | add back last ten |
| 95 | | ld e,a | store result in e |
| 201 | | ret | end of sub-routine |

*continued from page 129*

locations in this fashion and can be inspected by entering:

PRINT PEEK first address + 256 * PEEK subsequent address

For example, if a Spectrum is used without a microdrive attached the microdrive map will be non-existent and the channel information will follow immediately after the system variables areas. Thus the value of the CHANS system variable will be the same as the starting address of the microdrive map, were it to exist, that it, 23734. CHANS is held at 23631 and 23632 and so entering

PRINT PEEK 23631 + 256 * PEEK 23632

will yield the value 23734.

The PEEK function can be used to look at the contents of any location in memory, including the fixed instructions in ROM. It is therefore a very important tool. PEEKing any location will not cause the Spectrum to crash or corrupt a program or variables. Very occasionally, the results of a PEEK can be misleading because the contents of the location being PEEKed may alter during or immediately after the execution of the instruction. For example, if the contents of the locations which are assigned to the top left hand corner of the screen display are PEEKed and the results PRINTed in the top left hand corner of the screen, the information will already be out-of-date by the time the user views it.

The POKE command is altogether more dangerous than the PEEK function because by invoking it the user is likely to interfere in the functioning of the Spectrum. It is quite possible using this command to make a nonsense of the information in RAM causing the machine to crash, or to halt and display an error code.

The form of that command is:

POKE address, number

Once again, the address is a positive whole number between 0 and 65535 inclusive, or an arithmetic expression which gives such a number when evaluated. Unlike PEEK is is not essential to enclose an arithmetic expression in brackets because POKE is a command, not a function, and therefore cannot be evaluated as a whole. The number POKEd into a location must lie between 0 and 255 inclusive.

Both the ZX-81 and the Spectrum will accept and execute a POKE command directed at an address in ROM — an address between 0 and 16383 inclusive. However, the number will never reach its destination because the contents of ROM are fixed. That fact can be demonstrated by RUNning the following program:

```
10 PRINT PEEK 0
20 POKE 0, 92
30 PRINT PEEK 0
```

Line 10 PRINTs the contents of the first location in ROM. Line 20 attempts to alter the contents to 92 but line 30 will show that no effect has registered.

The final letter comes from Michael Mehta of Stoke-on-Trent. He writes: **"Could you supply a machine code routine on the Spectrum which shows the elapsed time in minutes and seconds on the screen? I know how to do the job in Basic but the routine takes too long to run."**

The machine code routine to display minutes and seconds is listed in table two. As usual, I have listed the code in decimal so that those people who do not have an assembler can POKE it straight into memory.

Please note that the routine runs under the interrupt system. This is achieved by setting the Z80 into interrupt mode two and then vectoring the call to the beginning of the routine.

● *Please address problems and queries to Andrew Hewson, Helpline, Graham Close, Blewbury, Oxfordshire.*

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**North London Hobby Computer Club:** ZX users' group at North London Polytechnic, Holloway Road, London N7 Monday, 6pm.

**Nottingham Microcomputer Club:** ZX-80-81 users' group. G E Basford, 9 Holme Close, The Pastures, Woodborough, Nottingham.

**Orpington Computer Club:** Roger Pyatt, 23 Arundel Drive, Orpington, Kent (Orpington 20281).

**Perth and District Amateur Computer Society:** Alastair MacPherson, 154 Oakbank Road, Perth PH1 1HA (29633). Meetings: third Tuesday of each month at Hunters Lodge Motel, Bankfoot.

**Regis Amateur Microcomputer Society:** R H Wallis, 22 Mallard Crescent, Pagham, Bognor Regis, West Sussex PO21 4UU.

**Roche Computer Club:** 8 Victoria Road, Coop Rooms, Roche, Cornwall: 0726 890473. Twice weekly meetings. Monday and Friday.

**Saltcoats Computer Club:** Colin Borland, 117 High Road, Saltcoats, Ayrshire KA21 5SD. Weekly meetings.

**Scunthorpe ZX Club:** C P Hazleton, 26 Rilestone Place, Bottesford, Scunthorpe, (0724 63466).

**Sheffield:** South Yorkshire Personal Computing Group. R Alderton (0742 20571), S Gray (0742 351440), P Sanderson (0742 351895).

**Sinclair Amateur Radio User Group:** SAE or two IRCs for details. Paul Newman G4 1NP, 3 Red House Lane, Leiston, Suffolk IP16 4JZ.

**Sinclair Mind Games Circle:** Formerly the Hobbit Appreciation Society. 12 Middlefield Lane, Hinckley, Leics.

**Sinclair Postal User Group:** 24 St Mary's Way, Code SUL, Chigwell, Essex IG7 5BX. Produces magazine with competitions.

**St Albans:** Bi-monthly meetings and a magazine. Details from Adam Slater, 40 Watford Road, St Albans, Herts AL1 2HA. (0727 54176).

**Stratford-on-Avon Computer Club:** Meets on the second Wednesday of every month. Telephone: 0789 68080 for details.

**Swansea Computer Club:** B J Candy, Jr Gorlau, Killay, Swansea (203811).

**Swindon ZX Computer Club:** Andrew Bartlett, 47 Grosvenor Road, Swindon, Wilts SN1 4LT; (0793) 3077. Monthly meetings and library.

**Sutton:** Sutton Library Computer Club, D Wilkins, 22 Chestnut Court, Mulgrave Road, Sutton, Surrey SM2 6LR.

**Swale Computer Club:** 1 Eastwood Road, Sittingbourne, Kent ME10 2LZ. Meets twice monthly. Contact: John Waterman.

**Washington Sinclair Users' Club:** Columbia Community Centre, Tyne and Wear. Meets twice a month, tel. 4179483 or 4167367.

**West Sussex:** Midhurst and District Computer User Group. Enquiries to V Weston (073 081 3876), R Armes (073 081 3279).

**Worle Computer Club:** S W Rabone, 18 Castle Road, Worle, Weston-super-Mare BS22 9JW (Weston-super-Mare 513068).

**Universal ZX Club:** Postal club for Spectrum owners in the UK and abroad. C Shaw, 1 Swiss Walk, Batley, W. Yorkshire.

**ZX-Aid:** Conrad Roe, 25 Cherry Tree Avenue, Walsall WS5 4LH. Please include sae. Meetings twice monthly.

## Overseas

**Australia:** Australian ZX Users' Newsletter, incorporating QL User. Paul Janson, P.O. Box 397, Dapto 3530, Australia. Also seeks unpaid contributions for the newsletter. — W.A. ZX Users' Group, Garth Gregson, 34 Chester Street, South Fremantle 6162. Phone 3351671.

**ZX Spectrum Users Group:** P.O. Box 466, Epping 2121, N.S.W., Australia. Contact: Craig Kennedy.

**Austria:** ZX User Club, Thomas Christian, c/o Wissenschaft Forscht e. V., Postfach 141, A1190 Vienna. Meets every first Friday of the month. Telephone 0222-44 32 050 for details.

**Denmark:** Danmarks National ZX-8081 Klub (DNZK), Jens Larson, Skovmosevej 6.4200 Slagelese, post giro 1 46 24 66.

ZZ-Brugergruppen i Danmark, Boks 44, 2650 Hvidovre, Gratis medlemskab og gratis blad til enhver interesseret.

J Niels-Erik Hartmann, OZ-ZX-Radioamator, Bruger Gruppe, Bredgade 25 DK-4900, Nakskov.

**Finland:** ZX-kerho, c/o Kalevi Hamalainen, Siltakatu 9 A 8, 33100 Tampere 10, Finland. Phone 35831-34238. Publishes quarterly paper.

**France:** Club Micro-Europe, Chemin du Moulin 38, B-1328 OHAIN, Belgium (19/32/2/6332769 ou soir 19/32/2/6537468) or Paris-Micro, 19 rue de Tilly, 92700, Colombes, France, associated with Club Micro-Europe.

08 Informatique Clubs, 18 rue P Curie, 08000 Charleville-Mezieres, 24/572106; associated with Club Micro-Europe.

Yves Chapron, no. SUS-1047, Rue du Puy, La Terrasse, 38660 Le Touvet, France. Specifically for users in the Alps.

**Germany:** ZX Club, a postal club; contact Aribert Deckers, Postfach 967, D-7000 Stuttgart 1, West Germany.

**Greece:** Athens Spectrum Club; Paris Stamelos, Spetsou 2, isi22 Marousi, Athens, Greece.

*continued on page 132*

*continued from page 131*

**Indonesia:** Jakarta ZX-80/81 Users' Club, J S Wijaya, PO Box 20, Jkukg, Jakarta, Utara, Indonesia.
**Irish Amateur Computer Club:** Martin Stapleton, 48 Seacourt, Clontarf, Dublin 3 (331304).
**Irish Sinclair Users' Club:** PO Box 1238, Dublin 1. Publishes a newsletter. Send SAE for details.
**Italy:** Sinclair Club, Via Molino Vecchio 10/F, 40026 Imola, Italy. Genova Sinclair Club; Vittorio Gioia, Via F Corridoni, 2-1, telephone 010 3125 51.
**The Netherlands:** Clive's Bits and Bytes, Paus Joannesstraat 32, 6235 CK Ulestraten. Telephone 043-644244. Contact: Louis Last.
**Republic of Ireland:** Irish ZX-8081 Users' Club, 73 Cnoc Crionain, Baile Atha, Cliath 1.
**Singapore:** Sinclair Users' Group: Charles Wong, 1005 Upper Bukit Timah Road, Singapore 2367.
**South Africa:** Amateur Spectrum Users' Club, PO Box 280, Winklespruit, Natal 4145. Steve Reinemo is interested in corresponding with users worldwide.
South African Sinclair Users' Club: PO Box 3923, Randburg 2125, Simon Lucas, chairman. Tel. (011) 704 2596.
Dumont and Syndercombe Amateur Computer Club: Jean-Pierre Dumont would like to correspond with ZX-81 owners via tapes. Write to 8 Kipling Road, Farrarmere, Benoni 1500, Transvaal.
ZX SA Club: Jonathan Jones, House 14, Anglo Alpha PO Box 15, 1725 Roodepoorf.
**Spain:** Club Nacional de Usuarios del ZX-81, Joseph-Oriol Tomas, Avda. de Madrid, No 203 207, 10, 3a esc. A Barcelona-14 Espana. International ZX Spectrum Club: Gabriel Indalecio Cano, Sardana, 4 atrico 2a, San Andres de la Barca, Barcelona. Send international reply coupon. Produces a bi-monthly magazine. Spanish ZX Micro Club: Apartado 181, Alicante (Costa Blanca), Spain.
ZX Club Spain; C Benito PO Box 3253, Madrid, Spain.
**Swedish ZX-club:** Sinclair Datorklubben, Box 1007, S-122, 22 Enskede.
**United States:** Bay Area ZX-80 User Group, 2660 Las Aromas, Oakland CA94611. — Harvard Group, Bolton Road, Harvard MA 01451: (617 456 3967) — SAF Users' Group, 2749 Eden Road, Leslie, Michigan 49251. — ZX Users' Group of New York, Box 560 Wall Street, New York, N.Y. USA 10005. Subscriptions $15US, publishes international newsletter. Seeks newsletter exchange with other groups.

# 'PSST!

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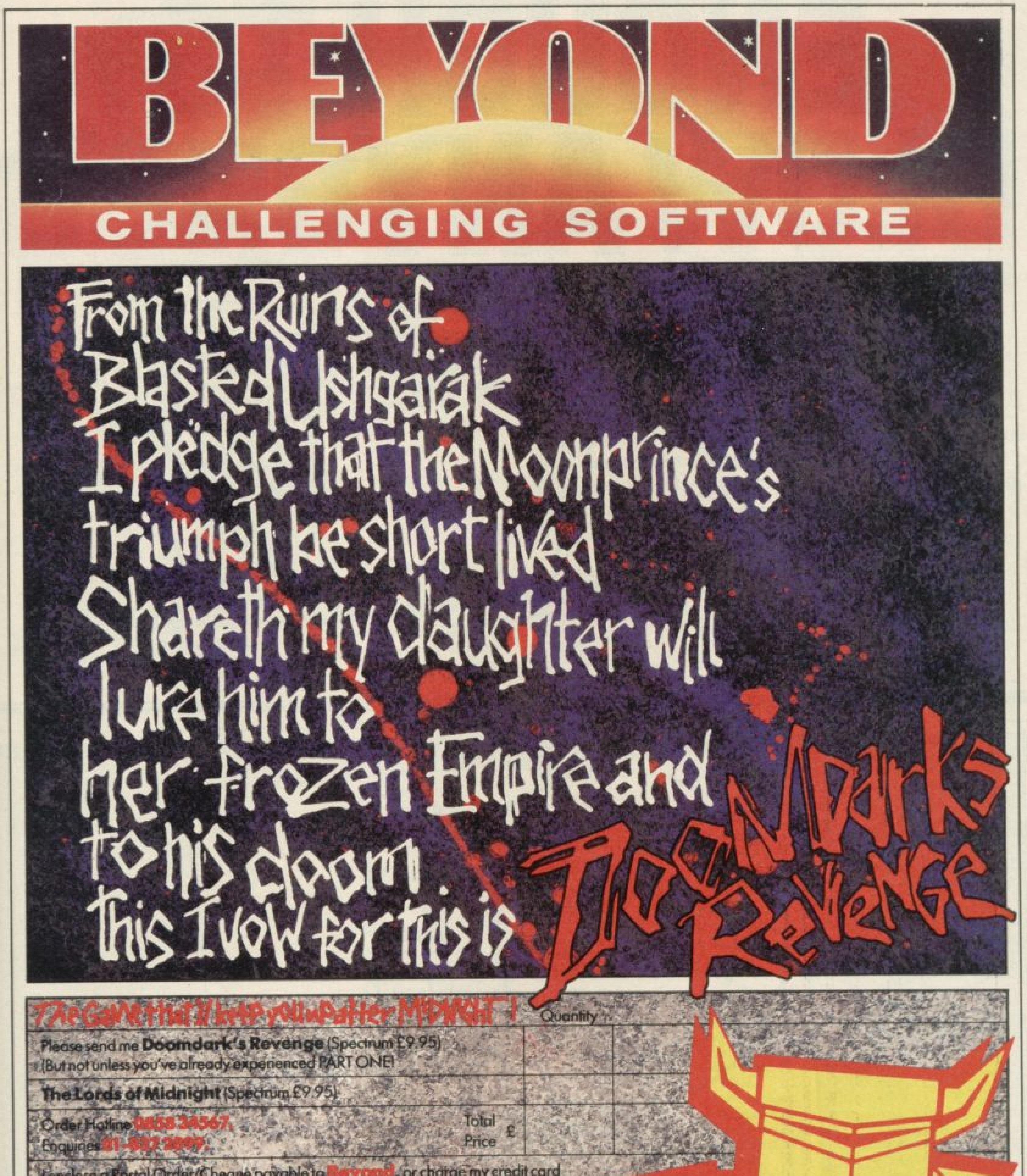
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BEYOND
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From the Ruins of Blasted Ushgarak
I pledge that the Moonprince's triumph be short lived
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SP/2/85



*If we have reviewed a program we have given it a rating known as the Gilbert Factor, named after our Software editor, John Gilbert. That factor includes clarity of instructions, speed of operations, ease of use, originality, lasting appeal, use made of graphics and sound, and success in accomplishing stated aims.*

## ZX-81

### Adventure

| | | |
|---|---|---|
| Adventure | Bug-Byte | 6 |
| Adventure | Gavin Barker | 6 |
| Adventure 1 | Abersoft | 6 |
| Black Crystal | Mastervision | 7 |
| Espionage Island | Artic | * |
| Greedy Gulch | Phipps | 7 |
| Lost Island | JRS | * |
| Magic Mountain | Phipps | * |
| Merchant of Venus | Crystal | 7 |
| Pharaoah's Tomb | Phipps | * |
| Pimania | Automata | 6 |
| Secret Valley | New Soft | * |
| Serpents Tomb | Vortex | * |
| Ship of Doom | Artic | 7 |
| Time Bandits | New Soft | * |
| Tomb of Dracula | Felix | * |
| Trader Trilogy | Quicksilva | 6 |
| Volcanic Dungeon | Mastervision | 5 |
| World of Illusions | Contrast | 4 |

### Arcade

| | | |
|---|---|---|
| Alien Dropout | Silversoft | * |
| Asteroids | Silversoft | 8 |
| Asteroids | Software Farm | 6 |
| Bank Robber | Romik | 6 |
| Bears in the Wood | Unicorn | 6 |
| Bubble Bugs | Romik | 6 |
| Byter | Protek | * |
| Cassette 1 | Orwin | 7 |
| Cassette 2-5 | Orwin | 7 |
| City Patrol | Sinclair | 7 |
| Damper | Quicksilva | 7 |
| Defenda | Quicksilva | 8 |
| Door Slammer | Cathedral | 7 |
| Forty-Niner | Software Farm | 9 |
| Froggy | DJL | 7 |
| Full-screen Breakout | New Generation | * |
| Galactic Trooper | Romik | |
| Galaxians | Quicksilva | 6 |
| Galaxy Jailbreak | Romik | 6 |
| Games Tape 1 | J K Greye | * |
| Games Tape 2 | J K Greye | * |
| Games Tape 3 | J K Greye | * |
| Gamestape 1 | Fawkes Computing | 7 |
| Glooper | Quicksilva | 7 |
| Gloops | Quicksilva | 5 |
| Gobbler | Software Farm | * |
| Grand Prix | dk'tronics | * |
| Hang Glider | S Electronics | 6 |
| Hickstead | CCS | 5 |
| High-resolution Invaders | Odyssey | * |
| Invaders | Abersoft | * |
| Invaders | Bug-Byte | 5 |
| Invaders | Odyssey | 8 |
| Invaders | Selec | 7 |
| Krazy Kong | PSS | * |
| M. Mouse goes de-bugging | Lothlorien | 7 |
| Maze Death Race | PSS | * |
| Maze Man | Abersoft | * |
| Mazogs | Bug-Byte | 8 |
| Micro Mouse | Lothlorien | 7 |
| Namtir Raiders | Artic | 8 |
| Night Gunner | Digital Integration | 5 |
| Rocket Man | Software Farm | 7 |
| Sabotage | Sinclair | 6 |
| Six Games | A Stubbs | 5 |
| Space Raiders | Sinclair | * |
| Space Rescue | D. Pinch | 7 |
| Space Trek | JRS | * |
| 3D Monster Maze | New Generation | 9 |
| Three Games Cassette | McGraw Hill | 8 |
| Zuckman | DJL | 8 |
| ZX Invasion Force | Artic | * |
| ZX Panic | Selec | 4 |
| ZX-81 1K Games Pack | Crystal | 9 |
| ZX-81 Pocket Book | Phipps | * |

### Business

| | | |
|---|---|---|
| Accounts (Limited company) | Hestacrest | * |
| Accounts (Sole Trader) | Hestacrest | * |
| Business Bank Account | Transform | * |
| Critical Path Analysis | Hilderbay | 6 |
| Draft | Myrmidon | * |
| Payroll | Hilderbay | * |
| Payroll | Soft Tech | * |
| Payroll | V&H Computing | * |
| Personal Banking System | Hilton | * |
| Purchase Ledger | Hestacrest | * |
| Sales Day Book | Transform | * |
| Sales Ledger | Hestacrest | * |
| Text | Contrast | 8 |

### Education

| | | |
|---|---|---|
| Binary Brains | Pooter | 5 |
| Four Rules of Number | Micro Master | * |
| Integration | University | 8 |
| Intermediate English 1-2 | Rose | * |
| Language Devel. Series | Glasson | * |
| Language Devel. Series | Micro Master | * |
| Linear Programming | University | * |
| Matrix Operations | University | 7 |
| O Level Chemistry | Calpac | * |
| O Level French Revision | Rose | * |
| O Level Maths Revision | Rose | * |
| Primary Arithmetic | Rose | * |
| Regression | University | * |
| Self teach Program | Anvil | * |

### Language

| | | |
|---|---|---|
| Forth | Sinclair | 7 |
| ZX Forth | Artic | 8 |

### Practical

| | | |
|---|---|---|
| Ephemeris | Bridge | 7 |
| Poolster | Naigram | 3 |

### Puzzle

| | | |
|---|---|---|
| Nowotnik Puzzle | Phipps | * |
| Word Fit | Ram Writer | 6 |

### Simulation

| | | |
|---|---|---|
| Flight Simulation | Sinclair | 6 |
| Pilot | Hewson | 7 |
| Print Shop | CCS | * |

### Strategy

| | | |
|---|---|---|
| Airline | CCS | 7 |
| Auto Chef | CCS | 7 |
| Battleships | JRS | * |
| Conflict | Martech | 7 |
| Cyborg Wars | Stratagem | 7 |
| Dallas | CCS | 6 |
| Dictator | Bug-Byte | 7 |
| Fighter Pilot | Digital Integration | 5 |
| Football Manager | Addictive Games | 7 |
| Fort Apache | Contrast | 8 |
| Galaxy Conflict | Martech | 8 |
| Ocean Trader | Quicksilva | 7 |
| Pioneer Trail | Quicksilva | 7 |
| Racehorse Trainer | G Barker | 6 |

### Traditional

| | | |
|---|---|---|
| Do Not Pass Go | Work Force | * |
| Lynchmob | Bridge | 6 |
| Original Superchess | CP Software | * |
| ZX 1K Chess | Artic | * |
| ZX Compendium | Mastervision | 7 |
| ZX-Chess 1 | Artic | * |

### Utility

| | | |
|---|---|---|
| Graphics | IPA | * |
| Graphics Toolkit | JRS | 9 |
| HI Resolution | CRL | 6 |
| Machine Code Test Tool | OCP | * |
| MCoder | PSS | 8 |
| Programme Enhancement Renumber Delete | Work Force | * |
| Trace | Texgate | 7 |
| ZX Compiler | Silversoft | * |
| ZX Screenkit | Picturesque | * |
| ZX-Bug | Artic | * |
| ZXAS | Bug-Byte | * |

## SPECTRUM 16K

### Adventure

| | | |
|---|---|---|
| Android One | Vortex | * |
| Escape | New Generation | 8 |
| Moria | Severn | * |
| Planet of Death | Artic | 6 |
| Secret Valley | New Soft | * |
| The Great Western | New Soft | * |
| Time Bandits | New Soft | * |

### Arcade

| | | |
|---|---|---|
| Aquarius | Bug-Byte | 6 |
| Arcadia | Beau Jolly | 5 |
| Arcadian | J K Greye | 6 |
| Assassin | Spectrasoft | * |
| Avenger | Abacus | 5 |
| Baron | Temptation | * |
| Black Hole | Quest | 6 |
| Blind Alley | Sunshine | 7 |
| Caterpillar | CDS | * |
| Cavern Fighter | Bug-Byte | 4 |
| Centi-Bug | dk'tronics | * |
| Children's Compendium | Dymond | * |
| City Defence | Mikro-Gen | * |
| Colour Clash | Romik | 4 |
| Cookie | Ultimate | * |
| Cosmic Guerilla | Crystal | 8 |
| Crazy Cranes | Voyager | 5 |
| Creepy Crawler | Mikro-Gen | * |
| Crevasse and Hotfoot | Microsphere | 7 |
| Cruising | Sunshine | 4 |
| Cyber Rats | Silversoft | 7 |
| Death Chase | Micromega | 6 |
| Demolition | Comp. Rentals | * |
| Destroyer | Winters | * |
| Di-lithium Lift | Hewson | 3 |
| Doombugs | Work Force | 8 |
| Dymonoids | Dymond | * |
| Earth Defence | Artic | 5 |
| Ed-On | Add-On | 4 |
| Eskimo Eddie | Ocean | * |
| Family Games Pack | Hornby | * |
| Fireflash | Abacus | 5 |
| Froggy | DJL | 7 |
| Fruit Machine | dk'tronics | 6 |
| Galactians | dk'tronics | * |
| Galactic Trooper | Romik | 3 |
| Galactic Warriors | Abacus | 6 |
| Galaxians | Artic | 6 |
| Ghost Hunt | PSS | * |
| Gnasher | Mastertronic | 4 |
| Gobble-a-Ghost | CDS | * |
| Gobbleman | Artic | * |
| Godzilla and Martians | Temptation | 7 |
| Ground Attack | Silversoft | 6 |
| Gulpman | Campbell | * |
| Haunted Hedges | Micromega | 6 |
| Hopper | PSS | 6 |
| Horace and the Spiders | Sinclair | 8 |
| Horace Goes Skiing | Sinclair | 8 |
| Hungry Horace | Sinclair | 8 |
| Invasion Force | Artic | 8 |
| It's the Wooluf | Crystal | 5 |
| Jet Pac | Ultimate | 8 |
| Labyrinth | Axis | 4 |
| Luna Crabs | Micromega | 7 |
| Magic Meanies | CDS | 2 |
| Maze Chase | Hewson | 8 |
| Meteor Storm | Quicksilva | 7 |
| Meteoroids | dk'tronics | 7 |
| Meteoroids | Softek | 6 |
| Micro Mouse | Lothlorien | 6 |

| | | |
|---|---|---|
| Millypede | Add-on | 7 |
| Mined Out | Quicksilva | 7 |
| Moon Buggy | Visions | 6 |
| Mr Wong's Loopy Laundry | Artic | 6 |
| Muncher | Silversoft | 6 |
| Nanas | Mikro-Gen | * |
| Orbiter | Silversoft | 7 |
| Ostron | Softek | * |
| Pengy | Micromania | 4 |
| Planetoids | Sinclair | 8 |
| Proteus | Abacus | 5 |
| Rapedes | Visions | * |
| Repulsar | Softek | * |
| Rider | Virgin | 6 |
| Road Toad | dk'tronics | 7 |
| Robot Panic | Soft Mill | 1 |
| Sam Spade | Silversoft | 5 |
| Santa | Artic | * |
| Sentinel | Abacus | 7 |
| Shark Attack | Romik | 5 |
| Sheer Panic | Visions | 7 |
| Sir Lancelot | Melbourne House | 7 |
| Slippery Sid | Silversoft | 8 |
| Space Intruders | Quicksilva | 7 |
| Space Lanes | Cathedral | * |
| Space Raiders | Sinclair | 6 |
| Space Zombies | Mikro-Gen | * |
| Spec. Invaders | Artic | * |
| Spec. Scramble | Work Force | 7 |
| Spectipede | Mastertronic | 5 |
| Spectral Invaders | Bug-Byte | 8 |
| Spectral Panic | Hewson | 5 |
| Spectres | Bug-Byte | 6 |
| Strike Four | Spectresoft | 4 |
| Styx | Bug-Byte | 7 |
| Sub | Romik | * |
| Tank Battle | dk'tronics | 8 |
| 3D Monster Chase | Romik | 3 |
| Train Game | Microsphere | 9 |
| Trom | dk'tronics | 4 |
| Vortex | JK Greye | 5 |
| Winged Warlord | CDS | 6 |
| Wizard's Warriors | Abersoft | * |
| Yomp | Virgin | 7 |

## Business

| | | |
|---|---|---|
| Finance Manager | OCP | 9 |
| Masterfile 16 | Campbell | * |
| Matcalc | Work Force | * |
| Micropen | Contrast | * |
| Vu-Calc | Sinclair | 7 |
| Vu-File | Sinclair | 8 |

## Education

| | | |
|---|---|---|
| Alphabet Games | Sinclair | * |
| Apostrophe | Sinclair | 7 |
| Ballooning | Heinemann | * |
| Calpac 1-3 | Calpac | * |
| Car Journey | Heinemann | * |
| Cargo | Sinclair | * |
| Chess Tutor | Artic | 7 |
| Counting | Widget | * |
| Education One | Lerm | * |
| Educational | Startersoft | * |
| Estimator Racer | Psion | 8 |
| Firework Music | Soft Cottage | 8 |
| 40 Educational Games | Granada | * |
| Four Rules of Number | Micro Master | * |
| French Voc Test | Tutorial | * |
| Hidden Letters | Poppy | * |
| Hot Dot Spotter | Longman | * |
| Integration | University | 8 |
| Intermediate English 1-2 | Rose | * |
| Know Your Tables | Collins | * |
| Language Devel. Series | Micro Master | * |
| Learn Basic | Logic 3 | * |
| Marks Book | Lerm | * |
| Maths Invaders | Stell | * |
| Matrix Operations | University | 7 |
| Money | Poppy | 7 |
| Night Sky | Bridge | * |
| Number Painter | Psion | 7 |
| O Level Maths | Homestudy | * |
| O Level Physics | Homestudy | * |
| Paddington's Shopping Mix-up | Collins | * |
| Pathfinder | Widget | * |
| Polynomials | University | 8 |
| Primary Arithmetic | Rose | * |
| Punctuation Pete | Heinemann | * |
| Regression | University | 8 |
| Self-teach Program | Anvil | * |
| Shape Sorter | Widget | * |
| Special Agent | Heinemann | * |
| Spellbin | Startersoft | * |
| Use and Learn | Microl | 8 |

## Language

| | | |
|---|---|---|
| Beta Basic | Betasoft | 9 |

## Practical

| | | |
|---|---|---|
| Biorhythms | Spectrasoft | * |
| Countries of the World | Hewson | 8 |
| Cycle Planner | Medidata | 4 |
| Map of the UK | Kuma | 7 |
| Spectrasort | Spectradraw | 4 |

## Puzzle

| | | |
|---|---|---|
| Flippit | Sinclair | 7 |
| Hanoi King | Contrast | 7 |
| Lojix | Virgin | 3 |
| Nowotnik Puzzle | Phipps | 7 |
| Quazar | Rose | 4 |

## Simulation

| | | |
|---|---|---|
| Air Traffic Controller | Hewson | 6 |
| Airliner | Protek | 6 |
| Golf | R & R | 7 |
| Golf | Virgin | 7 |
| NightFlite | Hewson | 5 |
| Print Shop | CCS | 8 |
| Pro-Golf | Hornby | 7 |

## Strategy

| | | |
|---|---|---|
| Auto Chef | CCS | * |
| Big Match Soccer | Winters | * |
| Dallas | CCS | 6 |
| Dictator | dk'tronics | * |
| Football | Winters | * |
| Heathrow | Hewson | 8 |

## Traditional

| | | |
|---|---|---|
| Backgammon | Hewson | * |
| Bridge Tutor | CP Software | 8 |
| Bridgemaster | Serin | 9 |
| Challenge | Temptation | * |
| Gambling Tape | Dymond | * |
| Las Vegas | Temptation | 5 |
| Odds-on | RSD | * |
| Othello | CP Software | * |
| Pinball | Winters | * |
| Pool | Bug-Byte | 7 |
| Reversi | Sinclair | 8 |
| Solo Whist | Video Soft. | * |
| Spec. Microchess | Artic | * |
| Super Play 1 | Video Soft | * |
| Tennis | Winters | * |

## Utility

| | | |
|---|---|---|
| Aspect | Bug-Byte | 5 |
| Audio Sonics | Work Force | 4 |
| Auto Sonics | Buttercraft | 5 |
| Basic Utilities | Jaysoft | 6 |
| Character Generator | Spectrasoft | * |
| Dietron | Custom | 6 |
| Disassembler | dk'tronics | 7 |
| Display | Work Force | * |
| Editor/Assembler | Picturesque | 8 |
| Extended Basic | CP Software | 7 |
| FP Compiler | Softek | 9 |
| Friendly Face | Monitor | 7 |
| Keysounder | S and G | * |
| Letterfont | Allanson | 8 |
| Machine Code Test Tool | OCP | 7 |
| Master Toolkit | OCP | 7 |
| MCoder | PSS | 8 |
| Micropen | Contrast | * |
| Print Utilities | Sinclair | 7 |
| Programmer's Dream | Work Force | 8 |
| Renumber Delete | Work Force | * |
| Slow Loader | ELR | 9 |
| Sound FX | dk'tronics | 6 |
| Spec. Editor/ Assembler | Picturesque | 8 |
| Spec. Monitor | Picturesque | 7 |
| Spectrum Super Toolkit | Nectarine | 8 |
| Spectsound | PDQ | 2 |
| Supercode | CP | 8 |
| Taswide-64 | Tasman | * |
| Trace | Texgate | 8 |
| TT-S | Timedata | 8 |
| ZX Spectrum Assembler | McGraw Hill | 4 |
| ZXED | dk'tronics | * |

# SPECTRUM 48K

## Adventure

| | | |
|---|---|---|
| Abyss | CCS | 6 |
| Ace in the Hole | Add-on | * |
| Adventure 1 | Abersoft | 6 |
| Adventure Island | Contrast | * |
| Alchemist | Beau Jolly | 7 |
| Arcane Quest | Add-on | * |
| Atlas Assignment | Virgin | 7 |
| Black Crystal | Mastervision | 7 |
| Black Planet | Phipps | 7 |
| Buffer Adventure | Buffer Micro | 6 |
| Castle | Bug-Byte | * |
| Castle Blackstar | SCR | 7 |
| Circus | Channel 8 | 8 |
| Classic Adventure | Melbourne House | * |
| Colditz | Phipps | 8 |
| Colossal Caves | CP Software | 8 |
| Demon Lord | MCE | 5 |
| Detective | Arcade | 7 |
| Diamond Quest | CCS | 4 |
| Diamond Trail | Gilsoft | 7 |
| Doomdark's Revenge | Beyond | 9 |
| Dragonsbane | Quicksilva | 6 |
| Dungeon Master | Crystal Comp. | 8 |
| Dungeons of Doom | Temptation | 3 |
| Erik the Viking | Level Nine | 8 |
| Espionage Island | Artic | 5 |
| Eureka | Domark | 8 |
| Everest Ascent | Shepherd | 6 |
| Eye of Bain | Artic | 7 |
| Faerie | 8th Day | 6 |
| Fantasia Diamond | Hewson | 7 |
| Flight from the Dark | Hutchinson | 8 |
| Frog Face | Positive Image | 7 |
| Ghoulies | IMS Software | 7 |
| Golden Apple | Artic | 7 |
| Gorgon | Phipps | * |
| Halls of Things | Crystal Comp. | 9 |
| Hampstead | Melbourne House | 8 |
| Here comes the sun | Alligata | 7 |
| Hobbit | Melbourne House | 9 |
| Horror Atoll | Add-on | * |
| Ice Station Zero | 8th Day | 5 |
| Inca Curse | Artic | 6 |
| Inferno | Shepherd | 7 |
| Invincible Island | Shepherd | 7 |
| Island | Crystal | 4 |
| Island | Virgin | 7 |
| Jericho Road | Shards | 7 |
| Jungle Adventure | CCS | 4 |
| Kentilla | Micromega | 6 |
| King Arthur's Quest | Hill MacGibbon | 4 |
| Knight's Quest | Phipps | 6 |
| Legend | Century Software | 6 |
| Leopard Lord | Add-on | 4 |
| Lords of Midnight | Beyond | 9 |
| Lords of Time | Level Nine | 8 |
| Lost Over Bermuda | Add-on | * |
| Mad Martha | Mikro-Gen | 7 |
| Mad Martha II | Mikro-Gen | * |
| Mountains of Ket | Incentive | 8 |
| Murder at Manor | Gemtime | 7 |
| Mysterious Fairground | Buffer Micro | 6 |
| Odyssey of Hope | Martech | 6 |
| Oracle's Cave | Doric | 8 |
| Orc Slayer | Gamma Software | 5 |
| Paradox | Runesoft | 2 |
| Perseus and Andromeda | Channel 8 | 7 |
| Peter Pan | Hodder & Stoughton | 6 |
| Pimania | Automata | 7 |
| The Prince | CCS | 8 |
| The Prisoner | Spoof Software | 6 |
| Project X | Compass Software | 7 |
| Quest | Hewson | 7 |
| Quetzalcoatl | Virgin | 8 |
| Return to Eden | Level Nine | 8 |
| Roundsby Incident | Add-on | * |
| Runes of Zendos | Dorcas Software | 6 |
| Satan's Pendulum | Minatron | 7 |
| Sherlock | Melbourne House | 9 |
| Ship of Doom | Artic | 7 |
| Solaris | Softel | * |
| Spoof | Runesoft | 7 |
| Superspy | Shepherd | 5 |
| System 15000 | Craig Communications | 9 |

| | | |
|---|---|---|
| Temple of Vran | Incentive | 8 |
| Terror from The Deep | Add-on | * |
| The Final Mission | Incentive | 7 |
| The Wild Bunch | Firebird | 3 |
| Tir Na Nog | Gargoyle | 9 |
| Titanic | R&R | 5 |
| Tower of Despair | Games Workshop | 5 |
| Transylvanian Tower | Shepherd | 7 |
| Twin Kingdom Valley | Bug-Byte | 8 |
| Urban Upstart | Shepherd | 7 |
| Valhalla | Legend | 7 |
| Vampire Village | Terminal | 4 |
| Velnor's Lair | Quicksilva | 8 |
| Volcanic Dungeon | Mastervision | 6 |
| War of the Worlds | CRL | 4 |
| Waydor | IMS Software | 3 |
| Width of the World | Mosaic | 4 |
| Ziggarat of Dread | Add-on | * |

## Arcade

| | | |
|---|---|---|
| Ad Astra | Gargoyle Games | 8 |
| Adven. of a St Bernard | Mastertronic | 7 |
| Alcatraz Harry | Mastertronic | 3 |
| Android Two | Vortex | * |
| Ant Attack | Quicksilva | 8 |
| Antics | Bug-Byte | 8 |
| Arena 3000 | Microdeal | 5 |
| Armageddon | Silversoft | 3 |
| Astroplanner | Romik | 2 |
| Atic Atac | Ultimate | 8 |
| Automania | Micro-Gen | 6 |
| Avalon | Hewson | 9 |
| Backpacker's Guide to | | |
| the Universe | Fantasy Software | 6 |
| Base Invaders | Work Force | 6 |
| Battle Zone | Quicksilva | 5 |
| Beach Head | US Gold | 8 |
| Bear Bovver | Artic | 8 |
| Bewarehouse | Positive Image | 4 |
| Birds and Bees | Bug-Byte | 8 |
| Black Hawk | Creative Sparks | 7 |
| Blade Alley | PSS | 6 |
| Blue Thunder | Foundry Systems | 6 |
| Booty | Firebird | 7 |
| Boulder Dash | Front Runner | 5 |
| Bubble Trouble | Arcade | * |
| Bugaboo | Quicksilva | 7 |
| Butterfly | Pulsonic | 4 |
| Buzz Off | Electric | 5 |
| Caesar the Cat | Mirrorsoft | 7 |
| Carnival | Eclipse | 5 |
| Carpet Capers | Terminal | 7 |
| Cavelon | Ocean | 7 |
| Centipoid Plus 3 | Orwin | 5 |
| Chequered Flag | Sinclair | 8 |
| Chinese Juggler | Ocean | 5 |
| Chuckie Egg | A & F | 8 |
| Chuckman | CCI/Add-on | 8 |
| Close-In | Pulsonic | 4 |
| Codename Mat | Micromega | 9 |
| Corridors of Genon | New Generation | 9 |
| Cruise Attack | Mikro-Gen | * |
| Crusoe | Automata | 5 |
| Cyber Zone | Crystal | * |
| Cyclone | Vortex | 8 |
| Daley Thompson's | | |
| Decathlon | Ocean | 8 |
| Dangermouse in Double | | |
| Trouble | Creative Sparks | 8 |
| Death Chess 5000 | Artic | 7 |
| Defenda | Interstella | 2 |
| Deffendar | Mikro-Gen | * |
| Defusion | Incentive | 6 |
| Defusion/Worms | K-Tel | 3 |
| Demon Chase | Mansfield | 4 |
| Deus Ex Machina | Automata | 9 |
| Devil Rides In | Mastertronic | 7 |
| Dimension Destructors | Artic | 8 |
| Dinky Digger | Postern | 4 |
| Dodge City | Phoenix | 7 |
| Dr Franky and the Monster | Virgin | 6 |
| Dragonfire | Cheetahsoft | 5 |
| Driller Tanks | Sinclair | 3 |
| Energy 30,000 | Elm | 3 |
| Eric and the Floaters | Sinclair | 6 |
| Eskimo Eddie | Ocean | 4 |
| Exodus | Firebird | 3 |
| Frank N Stein | PSS | 7 |
| Fred | Quicksilva | 6 |
| Freez Beez | Silversoft | * |
| Froot Loop | NTD Software | 5 |
| Galaxy Attack | Sunshine | 4 |
| Ghost Rider | Positive Image | 4 |
| Giant's Revenge | Thor | 3 |
| Gilligan's Gold | Ocean | 6 |
| Glug Glug | CRL | 6 |
| H. Dumpty and the F. | | |
| Wuzzies | Artic | 5 |
| Havoc | Dynavision | 2 |
| Harry Goes Home | Pulsonic | 6 |
| Hickstead | CCS | 4 |
| High Noon | Work Force | 9 |
| House of Living Dead | Phipps | * |
| Hunchback | Ocean | 7 |
| Invasion Body Snatch. | Crystal | 9 |
| Jack and the Beanstalk | Thor | 5 |
| Jasper | Micromega | 6 |
| Jet Set Willy | Software Projects | 9 |
| Jump Challenge | Martech | 6 |
| Killer Knight | Phipps | 5 |
| Knight Lore | Ultimate | 9 |
| Knight Rider | Hewson | * |
| Kokotoni Wilf | Elite | 6 |
| Kosmic Kanga | Micromania | 5 |
| Krakatoa | Abbex | 8 |
| Krazy Kong | PSS | * |
| Kung-Fu | Bug-Byte | 6 |
| Laser Zone | Quicksilva | 8 |
| Laserwarp | Mikro-Gen | 6 |
| Lazatron | Contrast | * |
| Les Flics | PSS | 6 |
| Lode Runner | Software Projects | 6 |
| Loony Zoo | Phipps | 6 |
| Lunar Jetman | Ultimate | 8 |
| Magic Roundabout | CRL | 4 |
| Manic Miner | Bug-Byte | 9 |
| Matrix | Salamander | 7 |
| Maze Death Race | PSS | * |
| Maziacs | dk'tronics | 8 |
| Metagalactic Llamas | Salamander | 8 |
| Mission Impossible | Silversoft | 6 |
| Mission Omega | Pulsonic | 4 |
| Monkey Biznes | Artic | 7 |
| Moons of Tantalus | Cornhill | 5 |
| Mr Wimpey | Ocean | 7 |
| Mummy Mummy | Lothlorien | 6 |
| Munnery's Mergatroids | Abacus | 6 |
| New Cylon Attack | A'N'F | 5 |
| Night Gunner | Digital Integration | 6 |
| 1994 | Visions | 4 |
| Olympimania | Automata | 6 |
| Orion | Software Projects | 5 |
| Pedro | Beau Jolly | 7 |
| Penetrator | Melbourne House | 7 |
| Pi-Balled | Automata | 7 |
| Pi-Eyed | Automata | 6 |
| Pingo | Profisoft | 6 |
| Pitfall II | Activision | 5 |
| Potty Pigeon | Gremlin Graphics | 6 |
| Psi-Spy | Postern | 5 |
| Pssst | Ultimate | 7 |
| Psytron | Beyond | 9 |
| Pyjamarama | Mikro-Gen | 8 |
| Pyramid | Fantasy | 8 |
| Raider Cursed Mine | Arcade | * |
| Rapscallion | Bug-Byte | 6 |
| Reactor | Gemini | 7 |
| Rescue | Comp. Rentals | * |
| Rescue | Ocean | * |
| Revenge of the Killer | | |
| Tomatoes | Visions | 6 |
| Rider | Virgin | 6 |
| River Rescue | Creative Sparks | 3 |
| Robot Riot | Silversoft | 6 |
| Rommels Revenge | Crystal | 8 |
| Sabre Wulf | Ultimate | 8 |
| Scuba Dive | Durrell | 9 |
| Security Shelter | Add-on | * |
| Select 1 | Computer Records | |
| | Various | 7 |
| Skull | Games Machine | 5 |
| Snowball | Level 9 | 9 |
| Sorcery | Virgin | 7 |
| Space Station Zebra | Beyond | 6 |
| Spectron | Virgin | 6 |
| Spellbound | Beyond | 7 |
| Splat | Incentive | 8 |
| Sports Hero | Melbourne House | 6 |
| Stagecoach | Creative Sparks | 7 |
| Starbike | The Edge | 6 |
| Stop the Express | Sinclair | 8 |
| Strangeloop | Virgin | 9 |
| Submarine Strike | Pulsonic | 6 |
| Tachyon Command | Century Software | 2 |
| Tank Trax | Mastertronic | 3 |
| Technician Ted | Hewson | 7 |
| Terrahawks | CRL | 5 |
| The Guardian | PSS | 6 |
| The Pyramid | Fantasy | 7 |
| The Snowman | Quicksilva | 8 |
| 3D Bat Attack | Cheetahsoft | 6 |
| 3D Lunattack | Hewson | 6 |
| 3D Seiddab Attack | Hewson | 5 |
| 3D Star Wars | Add-on | 1 |
| 3D Tank Duel | Real Time | 6 |
| 3D Tunnel | New Generation | 9 |
| Tiler Tim | Microwish | 6 |
| Time Gate | Quicksilva | 8 |
| Timebomb | CDS | 7 |
| Tobor | Add-on | 7 |
| Tornado Low Level | Vortex | 8 |
| Tranz Am | Ultimate | * |
| Trashman | New Generation | 8 |
| Travel with Trashman | New Generation | 7 |
| Traxx | Quicksilva | 7 |
| Tribble Trubble | Software Projects | 8 |
| Trom | dk'tronics | 4 |
| Turtle Timewarp | Softstone | 4 |
| Tutankhamun | Micromania | 8 |
| Two-Gun Turtle | Lothlorien | 7 |
| Underwurlde | Ultimate | 8 |
| Warlock of Firetop | | |
| Mountain | Penguin | * |
| Wheelie | Microsphere | 7 |
| Worm Attack | Pulsonic | 2 |
| Worse Things Happen at Sea | Silversoft | 7 |
| Wrath of Magra | Mastervision | 8 |
| Xadom | Quicksilva | 4 |
| Zenji | Activision | 8 |
| Zig-Zag | dk'tronics | 7 |
| Zipper Flipper | Sinclair | 4 |
| Zombie Zombie | Quicksilva | 7 |

## Business

| | | |
|---|---|---|
| Accounts (Limited | | |
| Company) | Hestacrest | * |
| Accounts (Sole Trader) | Hestacrest | * |
| Address Manager | OCP | 7 |
| Bank Account System | K Gouldstone | 8 |
| Bank Verifier | SD Micro | * |
| Business Bank Account | Transform | * |
| Cash Controller | Shepherd | 7 |
| Collector's Pack | Sinclair | 7 |
| Critical Path Analysis | Hilderbay | * |
| Database | Microl | 7 |
| DIY Book-keeping | RAMTOP | * |
| Heathplanner | Heath Computing | 7 |
| Home Budget | Kuma Computers | 5 |
| Investment, Insurance, | | |
| Information | Inform | 5 |
| Invoicing/Accounting | Transform | 8 |
| Keyfile | Keysoft | 7 |
| Masterfile | Campbell | 8 |
| Micropen | Contrast | 5 |
| Money Manager | Creative Sparks | 6 |
| Multi-File | ISP | 6 |
| Omnicalc | Microsphere | 9 |
| Payroll | Transform | * |
| Personal Banking System | Hilton | * |
| Personal Financ. | | |
| Profile 2 | McGraw-Hill | 6 |
| Projector 1 | McGraw-Hill | 8 |
| Management Syst. | Fulwood | * |
| Sales Day Book | Transform | * |
| Sales Ledger | Hestacrest | 8 |
| Small Business Accounts | Sinclair | * |
| Spectext | McGraw Hill | 7 |
| Spreadsheet | Microl | 7 |
| Stock Control | Hilderbay | * |
| Stock Control | Transform | * |
| Tasword | Tasman | 8 |
| Tasword II | Tasman | 9 |
| Utility File | SD Micro | * |
| Va£Track | Morley Davies | 7 |
| Word Processor | Quicksilva | 2 |

## Education

| | | |
|---|---|---|
| ABC Liftoff | Longman | * |
| Angle | Chalksoft | 5 |
| Angle Turner | Arnold Wheaton | 7 |

| | | |
|---|---|---|
| Astro Maths | Scisoft | 6 |
| Biology | Longman | 7 |
| Blockbuster | Compusound | 7 |
| Castle | L'Ensouleiado | 7 |
| Castle of Dreams | Widgit | 7 |
| Castle Spellerous | Sinclair | 8 |
| Chess Tutor 1 | Sinclair | 7 |
| Clown | Englefield Software | 4 |
| Cortes | L'Ensouleiado | 6 |
| Countabout | Longman | * |
| Dyslexia Beater | Dunitz | 8 |
| Eiffel Tower | Chalksoft | 6 |
| Electronic Learner's Guide No. 1 | ETST | 6 |
| French | Longman | 8 |
| French is Fun | CDS | 5 |
| French Voc Test | Tutorial | * |
| Friend or Foe | Longman | 6 |
| Viking Raiders | Firebird | 6 |
| German is Fun | CDS | 8 |
| German Master | Kosmos | * |
| Guitar Tutor 1 | Harlequin | * |
| Guitar Tutor 2 | Harlequin | * |
| Highway Code | Learning Systems | 6 |
| Highwire | Englefield Software | 4 |
| Hotline | Chalksoft | 5 |
| Humpty Dumpty | Widget | 8 |
| Inkosi | Chalksoft | 5 |
| Jungle Jumble | Clever Cloggs | * |
| Jungle Maths | Scisoft | * |
| Learn to Read 1-5 | Sinclair | 7 |
| Letters and Numbers | Jimjams | * |
| Linkword | Silversoft | 6 |
| Look Sharp | Mirrorsoft | 7 |
| Macman in the Treasure Caves | Sinclair Research | 6 |
| Magnets | Sinclair | * |
| Make-a-Chip | Sinclair | * |
| Mansfield Park | Sussex | 7 |
| Mathskills II | Griffin | 7 |
| MDA-PCSS | MDA Assoc. | 7 |
| Mr T's Measuring Games | Ebury | 7 |
| Mr. Men | Mirror | * |
| Musicmaster | Sinclair | 6 |
| Nineteenth C. England | Sussex | 8 |
| O Level Chemistry | Calpac | * |
| O Level Physics | Think Tank | * |
| Party Time | C. Tutor | * |
| Pathfinder | Widget | 7 |
| Pirate | Chalksoft | 7 |
| Postman Pat's Trail Game | Longman | 7 |
| Riddle of the Sphinx | Longman | 6 |
| Run, Rabbit, Run | Longman | 7 |
| Sequences | Chalksoft | 5 |
| Snaffle | Longman | 8 |
| Spanish Gold | Chalksoft | * |
| Speak and Spell | S and G | * |
| Speech Marks | Sinclair | 7 |
| Spelling Bee | Image Systems | 5 |
| Star Reader | Scisoft | * |
| Startrucker | Widget | 7 |
| SuperTed | Longman | 6 |
| Teacher Data | B Farris | 8 |
| Tense French | Sullis | 7 |
| Time Traveller | Willey | * |
| Tuner | Soft Cottage | * |
| Wizard Box | Scisoft | * |
| Words and Pictures | Chalksoft | 6 |
| Wordsetter | Sinclair Research/ Macmillan | 7 |
| Word Wizard | Longman | 6 |
| Zoo | L'Ensouleiado | 6 |

## Language

| | | |
|---|---|---|
| Beta Basic | Betasoft | 9 |
| Forth | Melbourne House | 9 |
| Forth | Sinclair | 7 |
| 48/80 Forth | E London Robotics | 7 |
| Hisoft C | Hisoft | 9 |
| Logo | Sinclair | 9 |
| Micro Prolog | Sinclair | 8 |
| Pascal Computer | Hi-Soft | * |
| Snail Logo | CP | 8 |
| Spec. Forth | Abersoft | 9 |
| Spec. Forth | CP | 8 |
| ZX Forth | Artic | 8 |

## Practical

| | | |
|---|---|---|
| Astronomer | CP Software | 7 |
| Beamscan | Beamscan | 9 |
| Computer Cookbook | Bug Byte | 5 |
| Cricket Averages | Spartan CC | 7 |
| Diet | dk'tronics | * |
| Diet Master | Diet Master | 6 |
| Dietician | Keysoft | 4 |
| First Aid | Eastmead | 4 |
| Football Pools | Hartland | * |
| How Long have you got? | Eastmead | 6 |
| I Ching | Salamander | 7 |
| I Ching | Sirius | * |
| Know Your Own Personality | Mirrorsoft | 6 |
| Love Oracle | Solar Publishing | 5 |
| Spectadraw 2 | McAlley | * |
| Star Gazer | CRL | 8 |
| The Complete Guide to Medicine | Eastmead | 4 |
| Vega-Table | Vega | 7 |
| World Info | Wimsoft | * |

## Puzzle

| | | |
|---|---|---|
| Arcturus | Visions | 7 |
| Computaword | Work Force | 2 |
| Flix | Softricks | 7 |
| Hanoi King | Contrast | * |
| Hareraiser | Haresoft | 3 |
| Jumbly | dk'tronics | * |
| Mazecube | PAL | 6 |
| Stuart Henry's Pop Quiz | Bellflower | 7 |
| 3D Strategy | Quicksilva | 8 |

## Simulation

| | | |
|---|---|---|
| American Football | Mind Games | |
| Ashes | Pulsonic | 7 |
| Combat Lynx | Durrell | 8 |
| Cricket Captain | Allanson | 6 |
| Fighter Pilot | Digital Integration | 9 |
| Flight Simulation | Sinclair | 6 |
| Full Throttle | Micromega | 8 |
| Golf | Virgin | 8 |
| Howzat | Wyvern | 8 |
| Match Point | Sinclair | 9 |
| New Birkdale | Hornby | 8 |
| Olympics | CRL | 6 |
| Royal Birkdale | Ocean | 8 |
| Steve Davis Snooker | CDS Micro Systems | 7 |
| Strike Attack | Micromart | 4 |
| Super Soccer | Winters | 4 |
| Test Match | Comp. Rentals | 6 |
| The Forest | Phipps | 7 |
| Troon | Hornby | 8 |
| United | CCS | 4 |
| World Cup Football | Artic | 7 |

## Strategy

| | | |
|---|---|---|
| Airline | CCS | 7 |
| Angler | Virgin | 6 |
| Apocalypse | Red Shift | * |
| Atram | PD Visual Marketing | 5 |
| Battle 1917 | CCS | 8 |
| Battle of Britain | Microgame | * |
| Brewery | CCS | 8 |
| British Lowland | CCS | * |
| Caribbean Trader | E. Midland | 7 |
| Confrontation Master Programme | Lothlorien | 7 |
| Confrontation Scenarios Volume 1 | Lothlorien | 7 |
| Conquest | Cheetasoft | 6 |
| Dix Mille | CCS | 5 |
| Fall of Rome | ASP | 6 |
| Football Manager | Addictive Games | 7 |
| Galaxy Conflict | Martech | 8 |
| Gangsters | CCS | 8 |
| Gatecrasher | Quicksilva | 7 |
| General Election | Bug-Byte | 1 |
| Great Britain Ltd | Hessel | 7 |
| Hunter Killer | Protek | 9 |
| It's Only Rock 'n' Roll | K-Tel | 5 |
| Johnny Reb | Lothlorien | * |
| King Arthur | E. Midland | * |
| Millionaire | Incentive | 7 |
| Mugsy | Melbourne House | 8 |
| New Venture | Falcon | 4 |
| 1984 | Incentive | 7 |
| Oligopoly | CCS | 7 |
| Plunder | CCS | 8 |
| Red Weed | Lothlorien | 7 |
| Reichswald | MW Gamesworld | 3 |
| Scatterbrain | Manor | 3 |
| Sheepwalk | Virgin | 7 |
| Special Operations | Lothlorien | 8 |
| Spectrealm | Runesoft | 6 |
| Star Trader | Bug-Byte | 6 |
| Stonkers | Beau Jolly | 9 |
| Super-League | Cross | 6 |
| Viking Raiders | Firebird | 6 |
| War 70 | CCS | 8 |
| Whodunnit | CCS | 8 |
| Wilfred the Hairy | Microbyte | 2 |

## Traditional

| | | |
|---|---|---|
| Arcturus | Visions | 7 |
| Backgammon | CP Software | 7 |
| Brag | Turtle | 7 |
| Bridge Master | Serin | 7 |
| Bridge Player | CP Software | 8 |
| Bullseye | Mastertronic | 4 |
| Derby Day | CRL | 5 |
| Do Not Pass Go | Work Force | 6 |
| Double Dealer | MFM Software | 5 |
| Draughts | CP Software | 7 |
| Go To Jail | Automata | * |
| Grid run/Pontoon | Arcade | * |
| Mind Games | Oasis | 7 |
| Original Superchess | CP Software | * |
| Pontoon | Contrast | 3 |
| Roulette | Dymond | * |
| Scrabble | Sinclair | 8 |
| Snooker | Visions | * |
| Super Bridge | Buffer Micro | 7 |
| Superchess II | CP Software | 8 |
| Superchess III | CP Software | 9 |
| The Turk | OCP | 8 |
| Voice Chess | Artic | 9 |
| Yahtzi | Work Force | * |
| Yatzee | CP Software | 5 |
| ZX Draughts | CP Software | 7 |
| ZX Reversi | CP Software | 7 |
| ZX-Chess II | Artic | * |

## Utility

| | | |
|---|---|---|
| Allsort S-1 | A Firminger | 7 |
| Assembler | Artic | 6 |
| Beyond Basic | Sinclair | 5 |
| Building Price | J Redman | 6 |
| Cartoon Animation | Fowler | * |
| Character Generator | ISP | 8 |
| Compiler | Softek | 6 |
| Composer | Contrast | 2 |
| FP Compiler | Softek | 9 |
| Games Designer | Quicksilva | 7 |
| HURG | Melbourne House | 8 |
| Keyword Extension | Timedata | 8 |
| Linked Software: Information Handling | McGraw Hill | 3 |
| Make Music | Buffer Micro | 8 |
| Melbourne Draw | Melbourne House | 7 |
| Monitor/Diss. | Sinclair | 8 |
| Music Maker | Bellflower | 3 |
| Paintbox | Print & Plotter | 8 |
| Print Utilities | Sinclair | 7 |
| Quill | Gilsoft | 9 |
| Screen Machine | ISP | 7 |
| Softalk 1-2 | CP Software | 8 |
| Spec. Compiler | Softek | 7 |
| Spectre Mac/Mon | Oasis | 8 |
| Spectrosim | Shiva | 4 |
| Spectrum Extended Basic | CP Software | 7 |
| Spectrum Monitor | Picturesque | 7 |
| Spectrum Sprites | ISP | 8 |
| Spectrum Super Toolkit | Nectarine | 8 |
| Supercode II | CP Software | 8 |
| The Complete Machine Code Tutor | New Generation | 8 |
| Trans Express | Romantic Robot | 8 |
| Vu3D | Sinclair | 8 |
| White Lightning | Oasis | 9 |
| Zeus Assembler | Sinclair | 9 |

## QL

| | | |
|---|---|---|
| Assembler Dev. Package | Metacomco | 9 |
| Pascal | Computer One | 7 |
| QL Chess | Psion | 9 |
| Zkul | Talent Computer Systems | 7 |

**A & F Software**, Unit 8, Canalside Industrial Estate, Woodbine Street East, Rochdale, Lancashire OL16 5LB
**Abacus Software**, 21 Union Street, Ramsbottom, Nr Bury, Lancashire
**Abbex**, 20 Ashley Close, Manor Hall Drive, London NW4
**Abersoft**, 7 Maesfallen, Bow Street, Aberystwyth, Wales
**Activision**, 15 Harley House, Marylebone Road, London NW1
**Adder Publishing Ltd**, PO Box 148, Cambridge CB1 2EQ
**Add-on Electronics**, Units 2,3 & 4, Shire Hill Industrial Estate, Saffron Walden, Essex CB11 3AQ
**Addictive Games**, 7a Richmond Hill, Bournemouth BH2 6HE
**ADS**, 8 Bronchurch Street, Portsmouth, Hampshire PO4 8RY
**Allanson Computing**, 77 Chorley Road, Adlington, Chorley, Lancashire PR6 9LH
**Alligata Software**, 1 Orange Street, Sheffield S1 4DW
**APSm** 1 Golden Square, London W1
**Arcade Software**, Technology House, 32 Chislehurst Road, Orpington, Kent BR6 0DG
**Arnold Wheaton**, Parkside Lane, Dewsbury Road, Leeds LS11 5TD
**Artic Computing**, Main Street, Brandesburton, Driffield YO25 8RG
**Automata UK**, 27 Highland Road, Portsmouth, Hampshire P04 9DA
**Axis**, 71 Brookfield Avenue, Loughborough, Leicestershire LE11 3LN
**Beau-Jolly**, 19A New Broadway, Ealing, London W5
**Bellflower Software**, 6 Rosewood Avenue, Greenford, Middlesex UB6 7QP
**Betasoft**, 92 Oxford Road, Moseley, Birmingham B13 9SQ
**Beyond Software**, Lector Court, 151 Farringdon Road, London EC1
**Bridge Software**, 36 Fernwood, Marple Bridge, Stockport, Cheshire SK6 5BE
**Bridgemaster**, Sandymouth, Beeches Road, Farnham Common, Buckinghamshire SL2 3PS
**Buffer Micro**, 310 Streatham High Road, London SW16
**Bug-Byte**, Mulberry House, Canning Place, Liverpool L1 8JB
**Calpac Computer Software**, 108 Hermitage Woods Crescent, St Johns, Woking, Surrey
**Campbell Systems**, 57 Trap's Hill, Loughton, Essex 1G10 1TD
**CCS**, 14 Langton Way, Blackheath, London SE3 7TL
**CDS Micro Systems**, Silver House, Silver Street, Doncaster, South Yorkshire DN1 1HL
**Century Communications**, Portland House, 12-13 Greek Street, London W1V 5LE
**Chalksoft**, 17 Willowslea Road, Northwick, Worcester
**Channel 8**, 51 Fishgate, Preston, Lancashire PR1 8BH
**Cheetahsoft**, 24 Ray Street, London EC1R 3DJ
**Clever Clogs**, Argus Press Software Group, 1 Golden Square, London W1R 3AB
**Collins**, 18/20 Stephenson Way, North Gower Street, London NW1 2DX
**Compusound**, 32/33 Langley Close, Redditch, Worcester B98 0ET
**Computatutor**, 3 Thalia Close, Greenwich, London SE10 9NA
**Computer One**, 32 Science Park, Milton Road, Cambridge CB4 4DH
**Contrast Software**, Warren Road, Liss, Hampshire GU33 7DD
**Cornhill Software**, 2 Penrith Way, Aylesbury, Buckinghamshire HP21 7JZ
**CP Software**, 1 Glebe Road, Uxbridge, Middlexex UB8 2RD
**Craig Communications**, PO Box 46, Basingstoke, Hampshire
**Creative Sparks**, Thomson House, 296 Farnborough Road, Farnborough, Hampshire
**CRL**, 9 King's Yard, Carpenters Road, London E15 2HD
**Cross Software**, 36 Langford Crescent, Barnet, Hertfordshire EN4 9EH
**Crystal Computing**, 2 Ashton Way, East Herrington, Sunderland SR3 3RX
**CSP Systems**, 213 Stainbeck Road, Leeds
**D Pinch**, 72 Norwood Crescent, Coldbrook, Barry, South Glamorgan
**Digital Integration**, Watchmoor Trade Centre, Watchmoor Road, Camberley, Surrey GU15 3AJ
**DJL**, 9 Tweed Close, Swindon, Wiltshire SN2 3PU
**DK'tronics**, Unit 6, Shire Hill Ind Est, Saffron Walden, Essex CB11 3A
**Domark**, 228 Munster road, London SW6
**Dorcas Software**, 3 The Oasis, Glenfield, Leicester
**Doric Computer Services**, 3 The Oasis, Glenfield, Leicester LE3 8QS
**Dunitz**, 154 Camden High Street, London NW1 0NE
**Durrell Software**, Castle Lodge, Castle Green, Taunton TA1 4AB
**Dymond Software**, 22 Hospital Road, Annan, Dumfriesshire DG12 5HP
**Dynavision Production Studio**, PO Box 96, Luton LU3 2JP
**East London Robotics**, St Nicholas House, The Mount, Guildford, Surrey GU2 5HN
**Eastmead**, Eastmead House, Lion Way, Camberley, Surrey GU16 5EZ
**Ebury Press**, Humphrey Bull & Barker, 62 Dean Street, London W1V 5HG
**8th Day**, 18 Flaxhill, Moreton, Wirral, Merseyside LU6 7UH
**Electric Abacus**, Oaklands House, Solartron Road, Farnborough, Hants
**Elite Systems**, 55 Bradford Street, Walsall, West Midlands WS1 3QD
**Elm Computers**, 59 Bateman Road, East leake, Loughborough, Leicestershire LE12 6NN
**Englefield Software**, High House, Mill Street, Buxton, Norfolk NR10 5JE
**Fantasy Software**, Fauconberg Lodge, 27a St Georges Road, Cheltenham
**Fawkes Computing**, 41 Wolfridge Ride, Alveston, Bristol BS12 2RA
**Felix Software**, 19 Leighton Avenue, Pinner HA5 3BW
**Front Runner**, 620 Western Ave, London W3 0TU
**Fulwood**, 20 Templestowe Hill, Whitkirk, Leeds LS15 7EJ
**Games Machine**, 40 Fretherne Road, Welwyn Garden City, Hertfordshire AL8 6NU
**Gamma Software**, 12 Milverton Road, London NW6 7AS
**Gargoyle Games**, 4 North Western Arcade, Birmingham BS 5LH
**Gavin Barker**, 12 Fleming Field, Shotton Colliery, County Durham DH6 2JF
**Gemini Software**, 18a Littleham Road, Exmouth, Devon EX8 2QG
**Gemtime Software**, 16 Ben Ledi Road, Kirkcaldy, Fife KY2 5RP
**Gilsoft**, 30 Hawthorn Road, Barry, South Glamorgan, South Wales
**Gouldstone**, 45 Burleigh Avenue, Wallington, Surrey SM6 7UG
**Granada Publishing**, 8 Grafton Street, London W1X 3LA
**Gremlin Graphics**, Alpha House, 10 Carver Street, Sheffield S1 4FS
**Griffin & George**, Frederick Street, Birmingham B1 3HT
**Haresoft**, PO Box 365, London NW1
**Harlequin Software**, 43 Osprey Park, Thornbury, Bristol BS12 1LY
**Hartland Software**, 32 Ivor Place, London NW1 6DA
**Heath Computing**, 7 The Meadows, Flackwell Heath, Buckinghamshire HP10 9LX
**Heinemann Computer Education**, 22 Bedford Square, London WC1B 3HH
**Hessel**, 15 Lythan Court, Cadwell Crescent, Sunningdale, Berkshire
**Hestacrest**, PO Box 19, Leighton Buzzard, Bedfordshire LU7 0DG
**Hewson Consultants**, 56B Milton Trading Estate, Milton, Abingdon
**Hilderbay**, 8/10 Parkway, Regents Park, London NW1 7AA
**Hilton Computer Services**, 14 Avalon Road, Orpington, Kent
**Hisoft**, 180 High Street, Dunstable, Bedfordshire LU6 1AT
**Hodder & Stoughton**, PO Box 6, Dunton Green, Sevenoaks, Kent TN13 2XX
**Homestudy Ltd**, Treleigh Woods Farm, Treleigh, Redruth, Cornwall TR16 4AW
**Hornby Software**, 21 Penfold Hill, Leeds LS15 0PW
**IMS Software**, 143/145 Uxbridge Road, Ealing, London W13 9AV
**Image Systems**, 34 Lynwood Drive, Worcester Park, Surrey KT4 7AB
**Incentive**, 54 London Street, Reading, Berkshire RG1 4SQ
**Inform Software**, 3 Treesdale Close, Birkdale, Southport PR8 2EL
**Interstella Software**, 82 New Forest Drive, Brockenhurst, Kent
**ISP Marketing Ltd**, Crown Hill, 38B High Street, Godalming, Surrey GU7 1DZ
**JK Greye Software**, 16 Park Street, Bath, Avon BA1 2TE
**JRS Software**, 19 Wayside Avenue, Worthing, Sussex BN13 3JH
**K-Tel International (UK)**, 60 Western Avenue, London W3 0TU
**Kemp**, 43 Muswell Hill, London N10 3PN
**Keysoft**, 6 Bruce Grove, Tottenham, London N17
**Kosmos Software**, 1 Pilgrims Close, Harlington, Dunstable, Bedfordshire LU5 6LX
**Kuma Computers**, 12 Horseshoe Park, Pangbourne, Berkshire RG8 7JW
**Learning Systems**, 11 Warwick Court, Princes Drive, Harrow, Middx HA1 4UB
**Legend**, PO Box 435, London E4 7LX
**Lerm**, 10 Brunswick Gardens, Corby, Northamptonshire
**Level Nine**, 229 Hugenden Road, High Wycombe, Buckinghamshire HP13 5PG
**Logic 3**, Unit 18, Wye Ind Est, London Road, High Wycombe, Buckinghamshire
**Longman**, Longman Group, Longman House, Harlow, Essex CM20 2JE
**Lothlorien**, 56a Park Lane, Poynton, Stockport, Cheshire SK12 1RE
**Manor Software**, 24 Manor Gardens, London SW20
**Martech Games**, 9 Billingburgh Road, Eastbourne, East Sussex BN20 8LY
**Mastertronic**, (as for Mastervision)
**Mastervision**, Park Lorne, 111 Park Road, London NW8 7SL
**McAlley**, 1 Cowleaze, Chinnor, Oxfordshire OX9 4TD
**McGraw Hill**, Shoppen Hangers Road, Maidenhead, Berkshire
**Medidata**, PO Box 26, London NW9 9BW
**Melbourne House**, Castle Yard House, Castle Yard, Richmond TW10 6TF

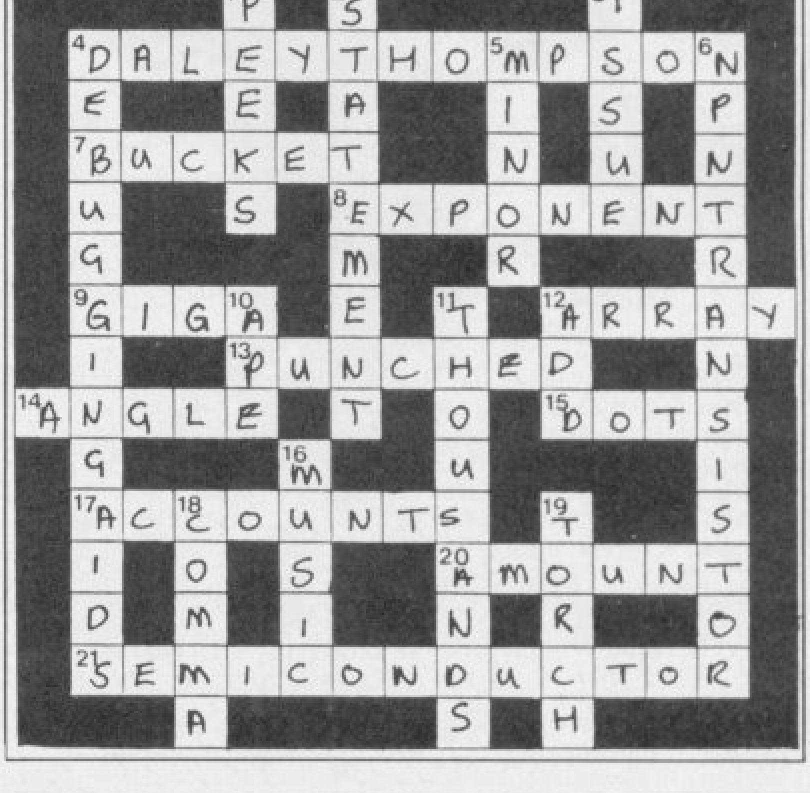
*continued on page 142*

# Software Publishers

*continued from page 141*

**Metacomco,** 26 Portland Square, Bristol BS2 8RZ
**Micro Dealer UK,** Unit 6 Marlborough Road Trading Estate, Lattimore Road, St Albans, Hertfordshire
**Micro Wish,** PO Box 15, Colne, Lancashire BB8 9DB
**Microbyte,** 19 Worcester Close, Lichfield, Staffordshire
**Microcosm,** 68 The Glade, Clayhall, Ilford
**Micromania,** 14 Lower Hill Road, Epsom, Surrey KT19 8LT
**Micromega,** 230/236 Lavender Hill, London SW11
**Microsphere,** 72 Rosebery Road, London N10 2LA
**Mikro-Gen,** 44 The Broadway, Bracknell, Berkshire RG12 1AG
**Minatron Computing,** 34 Pinewood Close, Westbury on Trym, Bristol BS9 4AJ
**Mirrorsoft,** PO Box 50, Bromley, Kent BR2 9TT
**Monitor Software,** PO Box 442, London NW7 2JF
**Mosaic,** 187 Upper Street, London N1 1RQ
**MW Gamesworld,** 12 Lawnswood Avenue, Chasetown, Walsall WS7 8YD
**Myrmidon Software,** PO Box 2, Tadworth, Surrey, KT20 7LU
**Naigram Software,** c/o Soho Synth House, 18A Soho Square, London W1V 5FB
**Nectarine,** 837 Yeovil Road, Slough SL1 4JH
**New Generation Software,** FREEPOST, Bath BA2 4TD
**Newsoft,** 12 White Broom Road, Hemel Hempstead, Hertfordshire
**NTD Software,** 19, Radipole Road, London SW6
**Oasis Software,** 9a Alexandra Parade, Weston-Super-Mare, Avon BS23 1QT
**Ocean Software,** 6 Central Street, Manchester M2 5NS
**OCP,** 4A High Street, Chalfont St Peter, Buckinghamshire SL9 9QB
**Orwin Software,** 26 Brownlow Road, Willesden, London NW10 9QL
**PD Visual Marketing,** Thanet House, Craven Road, London W2
**Penguin,** 536 King's Road, London SW10
**Phipps Associates,** 172 Kingston Road, Ewell, Surrey
**Phoenix Publishing,** 14 Vernon Road, Bushey, Hertfordshire WD2 2JL
**Picturesque,** 6 Corkscrew Hill, West Wickham, Kent BR4 9BB
**Pooter Games,** 24 Parsloes Avenue, Dagenham RM9 5NX
**Poppysoft,** The Close, Common Road, Headley, Newbury, Berkshire
**Positive Image Software,** 129 Dumbarton Road, Glasgow
**Postern Software,** PO Box 2, Anderovers Ford, Cheltenham, Gloucester GL54 5SW
**Print 'n' Plotter Products,** 19 Borough High Street, London SE1 9SE
**Protek Computing,** 1a Young Square, Brucefield Ind Park, Livingston, West Lothian
**Psion,** 2 Huntsworth Mews, Gloucester Place, London NW1
**PSS,** 452 Stoney Stanton Road, Coventry CV6 JDG
**Pulsonic,** Warwick Distribution Ltd, 3 Standard Road, Park Royal, London NW10 6EX
**Quest International Computer Systems,** Gillingham House, 38-44 Gillingham Street, London SW1
**Quicksilva,** Palmerstone Park House, Southampton, Hampshire S01 1LL
**RAM Writer,** 3 Vumba House, 2 Cedar Gardens, Sutton, Surrey
**Ramtop Services,** 5 Rue D'Artois, 75008, Paris, France
**Red Shift,** 12c Manor Road, Stoke Newington, London N16 5SA
**Romantic Robot,** 113 Melrose Avenue, London NW2 4LX
**Romik Software,** 272 Argyll Avenue, Slough SL1 4HE
**Rose Software,** 148 Widney Lane, Solihull, West Midlands
**Runesoft,** Charnwood House, Crossgate Drive, Nottingham NG2 TLW
**Salamander Software,** 27 Ditchling Rise, Brighton, East Sussex BN1 4QL
**Scisoft,** 5 Minister Gardens, Newthorpe, Eastwood, Nottingham NGJ6 2AT
**SCR Adventures,** 190 Shelbourne Road, Tottenham, London
**SD Microsystems,** PO Box 24, Hitchin, Hertfordshire SG4 0AQ
**Selec Software,** 37 Councillor Lane, Cheadle, Chesire
**Serim Software,** Freepost, Dept SU7, PO Box 163, Slough, Berkshire SL2 3YY
**Shards,** Suite G, Roycraft House, 15 Linton Road, Barking, Essex
**Shepherd Software,** Elm House, 23-25 Elmshott Lane, Chippenham, Slough, Berkshire
**Shiva Publishing,** 64 Welsh Row, Nantwich, Cheshire CW5 5BR
**Silversoft,** London House, 271/273 King Street, London W6 9LZ
**Sinclair Research,** 6 Kings Parade, Cambridge
**Soft Cottage,** 19 Westfield Drive, Loughborough, Leicestershire LE11 3QJ
**Soft Tech,** 31 Lampits, Hoddesdon, Hertfordshire
**Softek International,** 12/13 Henrietta Street, Covent Garden, London WC2E 8LH
**Softel,** 5 Durward Drive, Glenrothes, Fife KY6 2LB
**Software Farm,** 155 White Ladies Road, Clifton, Bristol BS8 2RG
**Software Projects,** Bear Brand Complex, Allerton Road, Woolton, Liverpool, Merseyside L25 7SE
**Spartan CC,** 29 Feltham Avenue, East Moseley, Surrey KT8 9BJ
**Spectadraw,** I Cowleaze, Chinnor, Oxfordshire OX9 4TD
**Spectrasoft,** Capital House, Market Place, London W3 6AL
**Spoof Software,** 58 Railway Road, Urmston, Manchester M31 1XT
**Startersoft,** 32 Parkfields, Chippenham, Wiltshire
**Stell Software,** 36 Limefield Avenue, Whalley, Lancashire BB6 9RJ
**Stratagem Cybernetics,** 286 Corbin Place, 2E, Brooklyn, New York 11235
**Sulis Software,** 4 Church Street, Abbey Green, Bath BA1 1FP
**Sunshine Books,** 12/13 Newport Street, London WC2
**Sussex Publication,** Townsend Poulshot, Devizes, Wiltshire SN10 1SD
**Talent Computer Systems** Curran Building, 101 St James Road, Glasgow G4 0NS
**Tasman Software,** 17 Hartley Crescent, Leeds LS6 2LL
**Temptation Software,** 27 Cinque Ports Street, Rye, East Sussex
**Terminal Software,** Derby House, Derby Street, Bury BL9 0NW
**Texgate,** 14 Brook Lane, Corfe Mullen, Wimbourne, Dorset
**Think Tank,** 35 Wellington Road, Wimbledon Park, London SW19
**Thor Computer Software,** Erskine Industrial Estate, Liverpool L6 1AP
**Timedata,** 16 Hemmells High Road, Laindon, Basildon, Essex SS15 6ED
**Transform,** 41 Keats House, Porchester Mead, Beckenham, Kent
**Tutorial Software,** 'Vilands', Glasllwch Lane, Newport, Gwent NP1 3PS
**Ultimate Play the Game,** The Green, Ashby de la Zouche, Leicestershire LE6 5JU
**Unicorn Micro Systems,** 312 Charminster Road, Bournemouth BH8 9RT
**University Software,** 29 St Peters Street, London N1
**US Gold,** Unit 24, Tipton Trading Estate, Bloomfield Road, Tipton, West Midlands DY4 9AH
**Vega Space Systems,** 28 Watford Road, St Albans AL1 2AJ
**Virgin Games,** 2-4 Vernon Yard, London W11
**Visions,** 1 Feldgate Mews, Studlands Street, London W6
**Vortex software,** 280 Brooklands Road, Brooklands, Manchester M23 9HD
**Widget Software,** 48 Durham Road, London N2 9DT
**Wilcox Software,** Station Road, Walsall WS7 6JZ
**Winters,** 24 Swannington Close, Cantley, Doncaster, South Yorkshire
**Woosoft,** 5 Andrews Close, Robertsbridge, Sussex TN32 5PB
**Workforce,** 140 Wilsden Avenue, Luton, Bedfordshire
**Wyvern Software,** 2 Princes Building, George Street, Bath BA1 2ED

## ZXWORD SOLUTION



# Sinclair spares and repairs



IF, LIKE MANY other Spectrum owners, you find one day that your computer has died, you will have a major problem on your hands. Phoning the Sinclair Research customer relations department in Camberley will not help very much either.

If your electronics knowledge is limited, then you will decide to send your Spectrum to one of the companies who specialise in repairing computers. If you have a good working knowledge of electronics then the addresses listed below should enable you to obtain most replacement parts to repair your computer. Some of the simpler repairs, such as those involving keyboards can be undertaken by those with limited knowledge.

If your computer is under guarantee then it is important that you do not invalidate that guarantee. Talk to the customer service division at Sinclair Research and they will tell you where to send it. When returning the computer put a note in describing the fault as briefly as possible, as this will speed the repair process.

## Suppliers of Sinclair parts:

**Adaptors and Eliminators,** 14 Thames Street, Louth, Lincolnshire. (050782) 8011. Spectrum and ZX-81 power supplies.
**ASTEC (UK),** 16 Albury Close, Reading, Berkshire. (0734) 53067. Supplies modulators for all countries PAL, NTSC, SECAM.
**CPC,** 194-200 North Road, Preston, Lancashire. (0772) 555034. Supplies all parts for Spectrum, ZX-81, ZX printer, ZX RAM pack including all case parts, power supplies and keyboard parts. Probably the best place to get ULA, ROM, case parts and keyboard.
**Ferranti Semiconductors,** Computer Road, Hollinwood Avenue, Oldham, Lancashire. (061) 682 6844, (061) 624 0515/6661. Supplies Spectrum and ZX-81 ULA.
**Maplin Electronics,** Southend on Sea, Essex. (0702) 552961. Supplies general components and data and technical books.
**National Semiconductors (UK) Ltd,** 301 Harpur Centre, Horne Lane, Bedford. (0234) 47147. Supplies Spectrum RAM/74LS series TTL; LM 1889 video chip.
**NEC (UK) Ltd,** Block 3, Carfin Industrial Estate, Motherwell. (0698) 73221. Supplies Spectrum ROM and RAM/74LS TTL; Z80A.
**Sinclair Research Ltd,** Camberley, Surrey. (0276) 685311.
**Texas Instruments,** Manton Lane, Bedford, Bedfordshire. (0234) 223000, (0234) 211655. Supplies RAM 4116, 4532, 4164, 74LS TTL (Spectrum).
**Timex Corporation,** Camperdown Plant, Harrison Road, Dundee, Tayside. (0382) 819211. Makers of Spectrum, ZX-81, Printer, Interface one, Microdrives, RAM Pack. Repair and service for Sinclair.
**Verran (Computerfix),** Units 2H & 2J, Albany Park, Frimley Road, Camberley, Surrey. (0276) 66266. Repairs Spectrums and ZX-81.
**Zilog (UK) Ltd,** Zilog House, 45-53 Moorbridge Road, Maidenhead, Berkshire. (0628) 39200. Supplies Z80A.

## Component companies

SOME OF THE large companies mentioned above do not like dealing directly with the public. The following is a list of component companies which should be happy to deal with you. Most will have catalogues available and will supply data sheets for their products on demand.

These firms are only distributors and they do not make components. If you have a problem with a particular device contact the manufacturer as listed above because not many of the distributors can answer technical questions; RS Components, Farnell, Ambitt and Hawkes may do. Anyone needing NEC parts should phone them direct and ask for some distributors dealing with them.

**Abacus Electronics,** Kennet House, Pembroke Road, Reading, Berkshire. (0734) 33311. Makes dealt with: National Semiconductors, SGS.
**Access Electronic Components Ltd,** Austin House, Bridge Street, Hitchen, Hertfordshire. (0462) 57244. Makes dealt with: National Semiconductors.
**Alpha Electronic Components Ltd,** 66 Wilbury Way, Hitchin, Hertfordshire. (0462) 57244. Makes dealt with: National Semiconductors.
**AM Lock Distribution Ltd,** Nevill Street, Middleton Road, Oldham, Lancashire. (061) 652 0431. Makes dealt with: Motorola, Mostek.
**Anzac Components Ltd,** Burnham Lane, Slough, Buckinghamshire. (06286) 4701. Makes dealt with: Hitachi.
**Axion Electronics Ltd,** Unit F, Turnpike Road, Cressex Industrial Estate, High Wycombe, Buckinghamshire. (0494) 442181. Makes dealt with: Motorola.
**BA Electronics Ltd,** Millbrook Road, Yate, Bristol. (0454) 315824. Makes dealt with: Texas Instruments.
**Celdis Ltd,** 37-39 Loverrock Road, Reading, Berkshire. (0734) 585171. Makes dealt with: Motorola, Mostek.
**Crellon Electronics Ltd,** 380 Bath Road, Slough, Berkshire. (06286) 4434. Makes dealt with: Motorola, SGS, Zilog.
**Dialogue Distribution Ltd,** Watchmore Road, Camberley, Surrey. (0276) 682001. Makes dealt with: Hitachi.
**DTV Group,** 10-12 Earnest Avenue, West Norwood, London SE27. (01) 670 6166. Makes dealt with: National Semiconductors.
**Farnell Electronic Components Ltd,** Canal Road, Leeds. (0532) 636311. Makes dealt with: Hitachi, National Semiconductors.
**Hawke Electronics Ltd,** Amotex House, 45 Hanworth Road, Sunbury on Thames, Middlesex. (01) 979 7799. Makes dealt with: Motorola, Texas Instruments. Will answer technical queries.
**Hill Electronics (NI) Ltd,** 290 Antrim Road, Belfast, Northern Ireland. Makes dealt with: Mostek.
**ITT Multicomponents,** Edinburgh Way, Harlow, Essex. (0279) 442971. Makes dealt with: Motorola, National Semiconductors, SGS, Texas Instruments and Hitachi.
**Macro Marketing Ltd,** Burnham Lane, Slough, Berkshire. (06286) 4422. Makes dealt with: Motorola, National Semiconductors, Zilog, Texas Instruments.
**Quarndon Electronics Ltd,** Slack Lane, Derby. (0332) 32651. Makes dealt with: Texas Instruments.
**STC Electronics,** Edinburgh Way, Harlow, Essex. (0279) 26777. Makes dealt with: Motorola, National Semiconductors, SGS, Texas Instruments and Hitachi.

## Computer parts

**Z80A:** Zilog, SGS, NEC (Spectrum/ZX-81).
**ULA:** Ferranti (Spectrum/ZX-81).
**ROM:** Hitachi, NEC (Spectrum), Mostek, Motorola (ZX-81).
**RAM:** 4116 type — NEC, National Semiconductors, Texas Instruments, ITT (Spectrum). 4532 type — Texas Instruments, OKI (Manhattan Skyline) (Spectrum). 2114 type — Motorola, NEC (ZX-81). 4118 type — Mostek (ZX-81). 2K type — Mostek, Toshiba, Motorola, Texas Instruments, NEC (ZX-81).
**LM1889:** ICI4 — National Semiconductors (Spectrum).
**TTL:** 74LS00/74LS32/74LS157 — Texas Instruments, SGS, Motorola, National Semiconductors, NEC.

The following are all used on the 48K Spectrum.

**Regulator:** LM7805 +5V Reg. — SGS, NEC, Texas Instruments, Motorola.
**Crystals, Capacitors, Resistors, Diodes, Sockets:** available through general component suppliers.
**Modulator:** UM1233 Astec (UK) Ltd.
**Leads:** available at most TV/electrical shops.
**Case parts:** Sendale Plastics.
**Keyboard:** CPC.

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## Advertisement Index


Activision ........ 27
Adventure International ........ 121
AGF ........ 37
AMS ........ 37
Argus ........

Betasoft ........ 125

Cambridge Micro Electronics ........ 114
Cambell Systems ........ 119
CCS ........ 36
Challenge Research ........ 70
Cheetah Marketing ........ 6,44
CP Software ........ 65
Cross Software ........ 82

DACC ........ 41
Datastar ........ 46
DR'tronics ........ 112/113
Digital Integration ........ 89
Domark ........ 73
Dorling Kindersley ........ 43

East London Robotics ........ 71
Eidersoft ........ 125
Eigen Software ........ 121
Epsom ........ 28/29

File Sixty ........ 81
Frel ........ 82

Games Workshop ........ 54/55
GCE Tutoring ........ 18
Gilsoft ........ 70
Gordon Micro ........ 83
Gremlin Graphics ........ 32/33

Hewson ........ 115
Hornby Software ........ 121

Interface ........ 118

JCS Software ........ 121

Kempston ........ 21
Kosmos ........ 125

Logic 3 ........

Micro X ........ 6
Micromend ........ 118
Micronet ........ 97-100
Micro Gen ........ IBC
Monitor ........ 18

National Software Library ........ 82
New Generation ........ 114
Northern Premier ........ 130

OCP ........ 62/63
Ocean ........ IFC,74/75

Picturesque ........ 130
Prism ........ 90/91
Punters Pal ........ 115

Quest ........ 13
Quicksilva ........ OBC

Ram ........ 18,49
RSD ........ 115

Saga ........ 24
Selec ........ 132
Servicon ........ 92
Sinclair Research ........ 22,23,67,105-9
SMT ........ 66
Software Farm ........ 76
Software Library ........ 83
Software Supermarket ........ 84
Spectadraw ........ 83

Tasman ........ 48
Tec Publications ........ 118
Thetford Micros ........ 132
Transform ........ 91,102

Ultimate ........ 97
University Software ........ 90
US Gold ........ 14,15,133

Verran ........ 52

Welwyn Electronics ........ 115

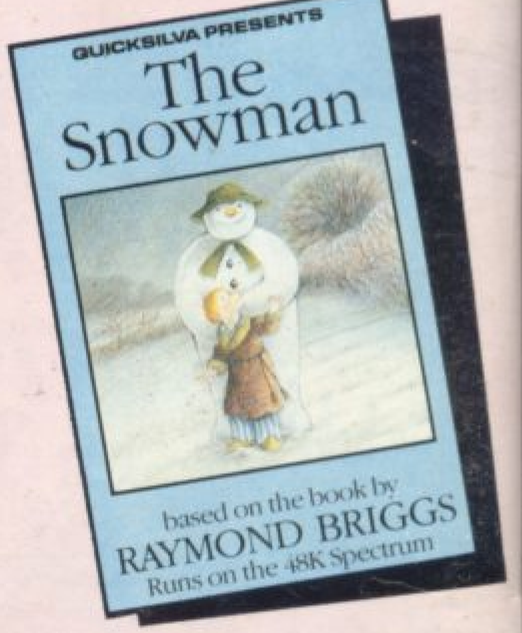
Zeal Marketing ........ 119

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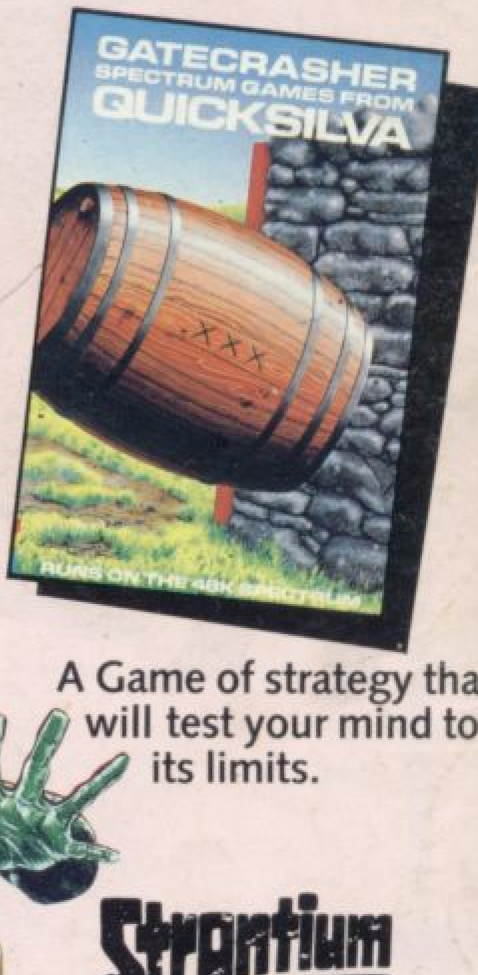


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